ELECTRICAL REVIEW

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Planning for the Future

Questions Which Must be Answered

THERE is still a large body of opinion which advocates that we should get on with the war and let planning wait until victory is achieved. When it is necessary to strain every sinew to ensure victory such a sentiment has considerable justification, for if the results of the war were unfavourable all plans would go by the board.

Another section of opinion, on the other hand, will be dissatisfied at anything less than immediate planning for the complete revolutionisation of everything. The idea is that any change or anything new must necessarily be good. While we must guard against the influence of these people, the fact remains that unless steps are taken towards rehabilitation now " victory " will mean a reckless " free for all " and all our talk of a better world will prove to have been just talk.

An Existing Basis

Radical changes will be necessary in a good many directions, but all plans must have a foundation and it seems evident that the things that we know must be used as a basis. Existing factories and plant, power stations, gasworks, etc., natural resources, and men and women are the materials from which any system must be built up. The nature of the existing organisations, and prejudices and predilections of men and women, must accordingly determine to a large degree the shape of all plans for the future. But existing organisations can be gradually adapted and men and women educated to meet post-war conditions if some indication is given of the part they are to take in the brave new world.

Electrical manufacturers will want to know, among other things, what kind of products they will be called upon to make, what the volume is likely to be, and who will have the placing of the orders. Matters of national policy are involved in the determination of these questions. Will there, for instance, be extensive electrification of rural areas and of the railways? Will there still be free competition, or will the Ministry of Fuel and Power be authorised to " co-ordinate " coal, gas, electricity and oil to the extent of forbidding or prescribing the use of any of these agents for particular applications?

International Problems

But wider considerations also come into the picture. A substantial part of our electrical production was shipped overseas before the war and so the manufacturers are necessarily anxious to know what courses other nations will pursue. Will former customers turn over their highly developed manufacturing plants to the making of all or a large part of the electrical equipment which they used to buy here? If so will they kill competition by high import duties or subsidies? Alternatively will there be agreements between nations for the sharing of international markets? If so what will be the effect upon the industries of each nation, or how will the individual shares be allocated? Answers will have to be found to these and other

fundamental questions if chaos is to be avoided and they can only be found by hard thinking and by looking forward and formulating plans—sectionally, nationally and internationally. Much is already being done but still there remains much more to do.

Another I.E.E. Section?

THE Installations Section of the Institution of Electrical Engineers is likely to be fissiparous, to judge from a statement made at its informal luncheon last week by Professor C. L. Fortescue, the President. Certainly the problems of utilisation in industry and in the home differ sufficiently in their nature to warrant separate treatment. In either case they present facets numerous enough to furnish subjects for more meetings than can be coped with by one Section. Common to both aspects is the duty, as the President suggested, of dealing with research into ways of getting over difficulties and the promotion of reliability.

A Standard Gauge

DIAMETERS of wires are less easily fitted into existing geometric gauge systems than are thicknesses of metal. Conductor sizes are now quoted in terms of the number of strands and diameter of each, but for some purposes the gauge number has advantages as a code word. While some reconciliation, within ordinary margins of tolerance, is possible between the most commonly used gauges there is more to be said for the adoption as a standard of one gauge of the self-indicating type in which the numbers are directly related to dimensions. The British Standards Institution in a Memorandum (reported in this issue) holds out hopes of very desirable agreement with the United States on this subject.

Australian Production

AUSTRALIA, once the principal customer for British electrical equipment, has advanced a good way along the road to self-sufficiency in this respect. In the ten years from 1930-31 to 1940-41 the value of electrical machinery and apparatus made in the Commonwealth increased from £2,169,000 to £8,972,000. The chief items were control equipment, motors, storage batteries, refrigerators and transformers. It is noteworthy that generating plant and cables do not loom large in the figures published by the Bureau of Census. Cables, largely obtained from the United Kingdom, have for many years been the largest import item.

The Cooking Load

MR. E. V. EVANS, the president of the Institution of Gas Engineers, referred to the unsatisfactory nature of the electric cooking load in his address to the Institution last week. Its wretched load factor so increased the costs of the supply undertaking that, it would seem, it would be a relief to transfer the whole of the business to the gas companies. While it is true that war conditions have made the use of the electric cooker between certain hours undesirable in some areas, in normal times very few electricity supply undertakings view the matter with any degree of alarm.

—and Water Heating

THIS is not to say that supply engineers are not aware that some improvement is desirable. A large number of people (ignorant of load-factor considerations) have come to prefer electric cooking and they might be persuaded to improve their methods of use. It is falsely assumed that all domestic cookers are on circuit at one and the same time; actually they are in use over several hours in the morning and evening. We could wish for the popularisation of the storage-type cooker, which never seems to have got a hold here (probably on account of its first cost), or for a change-over cooking-water heating system.

An Electrical Paradise

How enviable is the lot of the New Zealand electrical man! He does not have to devote most of his efforts to persuading his compatriots to use electricity—they just clamour for it. At least that is one impression gained from Mr. A. O. Glasse's address as president of the New Zealand Institution of Engineers. In that small country the annual consumption per head of the population increased seven-fold in sixteen years; in 1941 it was nearly 1,000 kWh. Mr. Glasse visualised a possible 3,500 kWh per head at some future date; this, he stated, would involve a plant capacity of 4 million kW.

Armour-Plate Welding

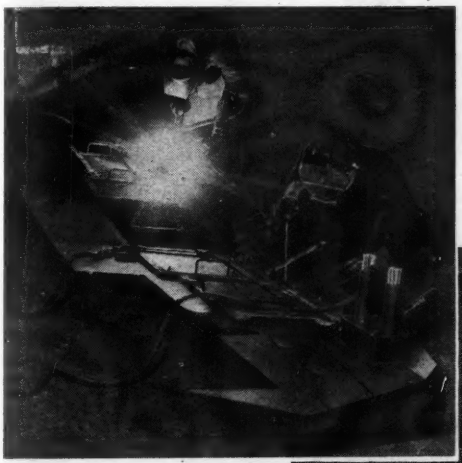
Jig Construction of a Completely Homogeneous Structure

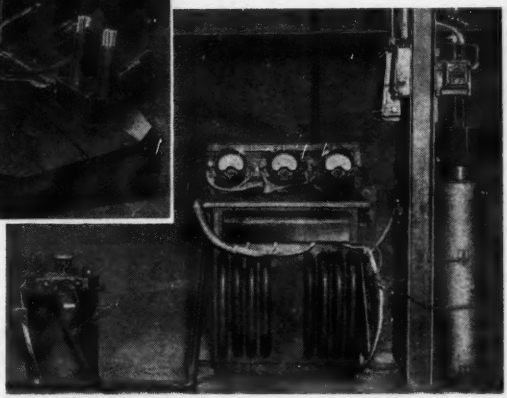
IN describing a recent visit to a factory which produces all-welded hulls for light armoured cars we not only refer to much that is special for this class of welding work, but emphasise again some important principles common to all or most electric fusion welding. Experience has proved that if the correct procedure is carried out the hull can be successfully welded into a complete homogeneous structure, and that in this form it will withstand the severest treatment in use. It is clear that construction by welding of such vehicles results in a considerable speeding-up of production and in reduction of cost and weight.

The main saving in material is obviously the elimination of the framework and plate lappings required for construction by riveting, while the avoidance of accurate machining operations—indeed, machining work of any description except portable-tool grinding—is one reason for the saving in labour. Whereas the tendency to arrange the plates of armoured vehicles in oblique planes presents added difficulties in the case of riveting, the more complicated the structure the greater is the saving in labour by welding.

Perhaps the outstanding production principle in evidence is that of "welding to jig," in that, for the main assemblies and sub-assemblies, the component parts are held in jigs in correct relationship for welding, the assemblies then being introduced in a jig manipulator which enables any weld run to be made in such a position as to afford the best welding technique. Coupled with the use of jigs, however, is the important principle of down-hand welding, whereby the central line through the point at the bottom of the "V" of the joint in which welding metal is to be deposited is vertical and the run is as near the horizontal as practicable, for the art of good welding is to keep the pool of molten metal always running back on the electrode.

Another vital necessity for successful production is the correct sequence in welding the joints of such a complex structure. Practical experience is a valuable guide to the correct procedure, but this can only be determined by actual experiment. In support of this one of a number of special welding procedure drawings prepared for the major operations may be mentioned. It relates to the exterior welding runs by which the two already-welded main side assemblies are built up in the manipulator with the various sub-assemblies of the top,



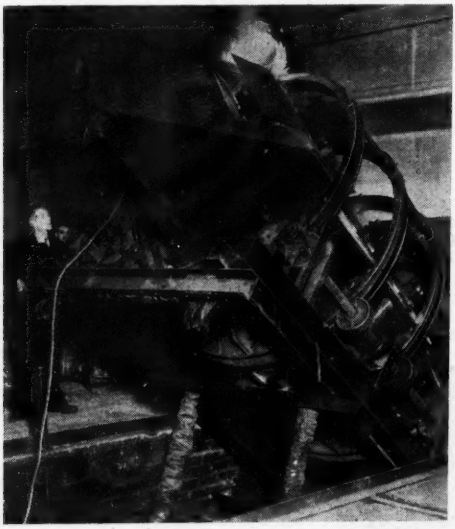


Above: Clamped in the female jig, the inverted side assembly is wash welded and various fitments are welded on by light-skeleton jigs

Right: At each welding-transformer station there is a 40-kVA, 400-V, three-phase transformer, each leg of the star secondary of which provides a s.p. welding circuit; one welding circuit current regulator is shown

back and front to form, thus far, a completely homogeneous structure.

About twenty sequence operations are detailed on the drawing and in each case the starting point for the welding run is clearly indicated and explicit instructions are given as to the size and type of electrode to be used and how runs should be made in easy stages progressively and alternately left and right from the starting point. There is a tendency for the various components to expand during the welding operations and the procedure which we have very roughly outlined is carefully laid down with a view to reducing to a minimum the consequent introduction of stresses, not only in the components, but in the structure as a whole.

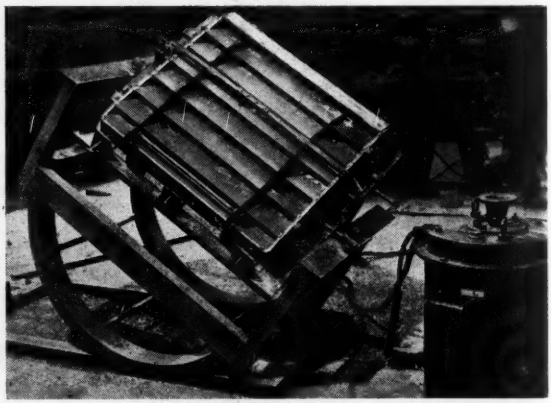


The manipulator jig is specially designed to facilitate the location of the welded sides in their correct relation to each other and the transverse plates

According to the thickness of the plate and metallurgical considerations relating to the complete structure, a particular joint may be constructed by a number of welding runs, and the planned procedure emphasises that unduly heavy welds should not be attempted at one run and that it is better to employ a greater number of runs to avoid excessive local heating of the plate and the creation of a softened zone.

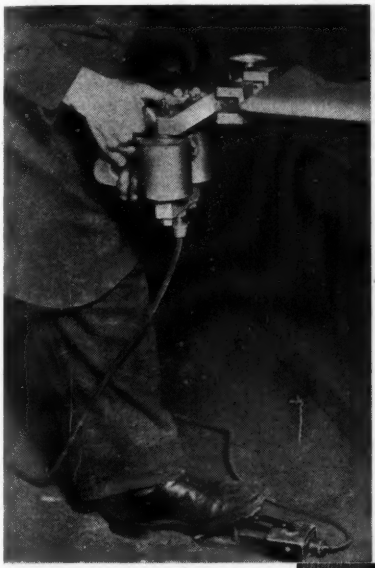
The choice of the type of electrode to be used is of outstanding importance in ensuring successful production. As the thickness of the plate increases, so does the rate of cooling immediately after welding, and above ¼-in. thickness this rate becomes high enough to cause air hardening effects which manifest themselves as hard zones at the borders of the welds, which may have insufficient ductility to withstand the strains imposed by the stresses created by the welding. In the control and possible prevention of these zones lies the choice of austenitic nickel - chromium steel electrodes for armour-plate welding. At room temperature ordinary carbon-steel is ferritic, while at high temperatures it is austenitic.

The special nickel - chromium electrodes are an example of how, by the addition of certain alloying elements, the austenitic condition is retained at room temperature, and the absence of a change-point is no doubt a major reason for the use of austenitic electrodes. These electrodes are of the flux-coated type and are thus suitable for both AC and DC welding, but all the normal production referred to is by AC.



A common feature of most of the sub-assembly jigs is arrangements which permit any part to be suitably placed for down-hand welding

For normal production 12-in. long electrodes are used, mainly in gauges 6, 8 and 10, with amperages of 160/165, 145/160 and 90/95, respectively. These conditions are made available at any required point



A magnetic crack detector is used to locate incipient cracks in plates prior to assembly and welding

in the factory by a number of welding transformer stations all supplied from a common sub-station.

At each of the welding-transformer stations there is a 40-kVA, 400-V, three-phase transformer connected delta-star, each leg of the secondary star and the common earthed neutral star-point providing one s.p. welding circuit. For each leg, however, there are 70-, 80- and 90-V tappings, and surmounting the transformer there are three ammeters, one for each s.p. circuit.

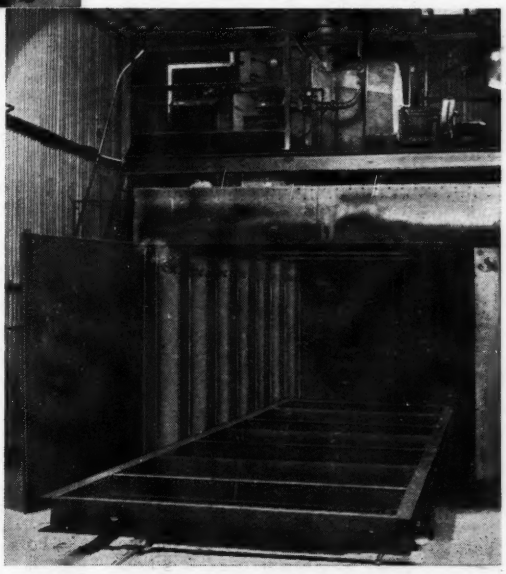
In each welding circuit is arranged a magnetic current regulator with four outlet plugs representing current ranges 30/45, 45/70, 70/125 and 125/280 A, respectively. In addition, there is a 10-point rotary regulator applicable to each outlet, so that overall the regulator will provide 40 current values within a complete range of 30 to 280 A, inclusive.

Each transformer is permanently arranged at the foot of a building stanchion on which are mounted an ironclad switch-fuse controlling the three-phase side of the transformer and a 25-kVA condenser connected across the 400-V side for local p.f. correction. Each regulator is in a semi-permanent position and the cable between the transformer and the regulator is run in screwed pipe laid on the floor surface. For the actual electrode lead from the regulator c.t.s. heavy trailing cable is used.

The Factory Processes

The homogeneous hard unmachinable quality plates are received at the factory already flame-cut to size and shape and with the necessary holes drilled. Where there is any doubt a magnetic detector is used to locate incipient cracks which are repaired by grinding, by a portable disc grinder, a "V" along the crack, drilling a hole beyond the crack and depositing welding metal in both the hole and crack. In subsequent stages of pfoduction, if cracks are found they are similarly repaired.

Although a strong point may be made of the absence of machining operations in construction by electric welding, we saw a certain amount of grinding work going on in the



The complete structure is finally heat treated in an oil-fired soaking furnace

modification and correction of plate profiles.

The first main operation in the production of the hull is the welding of the four plates to form each side assembly. The plates are set up on a special jig which has at the bottom suitably shaped and spaced supports which conform to the internal shape of the hull. The plates register with stops on the jig to impart the correct profile to the assembly, and at the bottoms of the supports are eccentrics by which the plates can be "inched" up or down on the supports to obtain the correct spacings at the joints.

Hinged arms at the top of the jig carrying compressed-air gripping bottles (cylinder and piston combinations) are lowered so that the plunger heads of the bottles actually bear on the plates. At the free ends the arms carry quick-coupling shackles, and when the air is applied to the bottles after coupling the whole equipment, jig and assembly, is tightened up.

After welding on the outside of the side assembly, this is crane-lifted off the main side jig by means of a female jig which conforms to the shape of the assembly and to which the assembly is first mechanically clamped. With its clamped assembly the female jig is then inverted on the shop floor so that the inside of the assembly is uppermost and suitably placed for wash welding, *i.e.*, applying sealing welding runs on the inside. If the exterior welding is correct the weld metal can now just be seen through the joints.

Attachment of Fittings

While the assembly is in this inverted position for wash welding the opportunity is taken to weld on such various fittings as shock-absorber brackets, floor handles and studs, and these are placed and held in their correct positions for welding by light frame jigs. Great importance is attached to the necessity of first obtaining the correct profile of these fitments, so that, when welded, there is no tendency to pull the plate to the fitting.

After the wash welding the side assembly has rigidity and so it is lifted off the female jig and taken to the manipulator. This is a jig specially designed to facilitate the location of the welded sides in their correct position in relation to each other and to the transverse plates, and to permit the hull to be readily rotated and tilted so that each joint can be brought into the correct position for flat down-hand welding. The equipment consists essentially of a standard hydraulic tipping truck which can be hinged at either end by means of links and bolts to a fixed traverse rod.

The truck is housed in a suitable pit in which also is a motor-driven pump which serves the hydraulic unit of the truck. On the truck is a carriage consisting of four rings within which the hull is held. The rings run on rollers and can be pushed round by hand, while hand brakes on the rings hold the carriage in any position.

There are two carriages to each manipulator, so that while one is on the truck during welding operations, assembly and tack welding of the hull components is taking place in the other one. While the vehicle is in the manipulator various devices are clamped or otherwise fixed internally to it to keep the structure flat and straight.

In order to obtain the maximum output from the available floor space the fabrication of the hull is divided as far as possible into a series of welded sub-assemblies, some of which are welded to the hull while this is in the manipulator and some after the hull has left the manipulator and is on the final production-flow line. These sub-assemblies—front plate, engine access door cover, radiator grille, driver's foot and seat wells, and so on—are all built up on special jigs, a common feature to most of which is a universal joint or other arrangement which permits any part of the sub-assembly to be suitably placed for down-hand welding.

Precision Welding

We have already indicated that greater tolerances can be permitted in construction by welding, but this by no means implies that precision welding is not desirable. Fabrication of the battle flap is an excellent example of such work. The main plate is first clamped to a bedplate so as to introduce a camber in it. The cambered plate is then mounted in a heavy clamp jig to which the hinge box and the flash strip are then introduced and the whole unit is welded. The intricate hinge box in six pieces is first welded separately in a special jig. An example of how the designer can "ring the changes" with construction by welding is the welding of the door framework to the hull *after* the door has been fitted. The strips forming the frame are first clamped to the door edges with intervening shims, and then tacked and finally welded to the hull.

As a safeguard against the introduction of stresses by welding the completed structure is finally heat treated, for the relief of the stresses, in an oil-fired soaking furnace which is thermostatically controlled throughout the complete heating and cooling cycle. This operation is not required for all vehicles as it depends on the type of armour-plate employed.

Cheerful Rationing

Suggestions for a summer lunch, and a summer supper for a chilly evening appear in the June issue of "Cheerful Rationing," which is published by the Electrical Association for Women, 20, Regent Street, London, S.W.1 (price 1½d. each, 2½d. post free). The leaflet also contains a number of useful hints on fruit bottling.

The I.M.E.A. in 1942-43

Council's Report on Activities

PAPER restrictions have forced the Council of the Incorporated Municipal Electrical Association to confine its report for the year ended May, 1943, to the more important subjects which have arisen during the period. The report was to be presented at the annual meeting yesterday (Thursday) at the Connaught Rooms, London, W.C.2.

Mr. F. Newey (Lincoln) has been re-elected president for the current year. The vice-president, Mr. W. P. Lilwall (Fleetwood), is also to continue in office. Mr. Lilwall took the place of Mr. W. N. C. Clinch, who left municipal for company service, in February last and the Council considered it unfair to ask him to take over the presidential duties after so short a period as vice-president. Thanks are expressed to Messrs. Newey, Lilwall and Clinch as well as to Mr. J. W. J. Townley, immediate past-president, Alderman Sir Percival Bower, honorary treasurer and Mr. E. E. Hoadley, honorary secretary.

Mr. F. Newey (Lincoln) has been re-elected president for 1943-44

It has been considered desirable to amend the articles of association so as to permit the election of a local authority representative as president or vice-president and this matter, with others, was to come before the members at an extraordinary meeting to be held before the annual general meeting.

Centre Organisation Completed

The inauguration of the South-West England and South Wales Area Centre during the year completed the Centre organisation for the whole country. Useful work is being done by the Centres. Membership of the Association remains at 347, representing 95 per cent. of the municipal undertakings in Great Britain.

Reference is made to the election of Mr. W. J. Bache, a past-president of the Association, as an honorary member and of Mr. F. H. Whysall, former city electrical engineer, Belfast, as an associated member and the deaths are recorded of Messrs. Rennie Dean, W. Dundas, S. E. Fedden, F. Garside, A. Pickersgill, T. S. Shenton, R. V. Weare and S. W. Weatherell, all former municipal electrical engineers and managers.

If negotiations in the Mid-East England Area with regard to bulk supply charges (referred to in the last report) fail to produce the desired result application will be made by one undertaker in the area to the Electricity Commissioners for a determination as is provided for in the 1926 Electricity (Supply) Act. Members of the North Wales and South Cheshire Area are now negotiating with the North Wales Power Co. for an adjustment of their bulk supply terms and the Council has appointed consulting engineers to assist the members in their investigations.

Increased Coal Costs

Grave concern is expressed at the continued increase in the price of coal. The Ministry of Fuel and Power has been questioned regarding the basis and justification for the increases and has replied:—"Increases have only been permitted when necessary to cover the increases in production costs. In a few cases variations are greater than in others because adjustments upwards or downwards have been made to bring prices more nearly into relation to values." The matter is still under discussion. The Conjoint Conference of Public Utility Associations has made representations upon the subject and has advocated the setting up of machinery to deal with complaints.

In connection with the reimbursement to the Central Electricity Board of increased costs of operation under wartime arrangements, the Council endorsed a recommendation from a meeting of station owners that certain "heads of agreement" between the Board and electricity supply associations should be adopted in principle. The Board has since stated that as its trading results were more favourable than had been anticipated it could properly agree to the deletion of the provisions relating to the payment of a surcharge by station owners. It was considered desirable, however, to retain the parts of the agreement providing for the temporary suspension of Section 7 (4) (a) of the 1926 Act and covering the financial provision which the Board had offered to the owners of stations which might be put wholly or partly out of action during the war. Steps are now being taken to implement the agreement by a Defence Order.

Mention is made of the agreement by the Board of Inland Revenue to admit wear and tear allowances for public lamps provided by an undertaking in place of the renewals expenditure hitherto allowed. A proposal for the securing of full cover against damage to undertakings' property in public highways

is considered as one to be deferred until after the war.

The Association has submitted comments upon the draft report of the Electrical Installations Committee convened by the I.E.E. to deal with electricity in post-war small houses, flats and schools.

In September last representatives of the I.M.E.A. and other electricity supply associations met the Electricity Commissioners and put forward reasons for the giving of general permission to undertakers to increase all tariffs by an amount equivalent to the added cost of coal during the war. The Commissioners replied that they gave full consideration to all applications for increases in charges from undertakings which were financially embarrassed but did not recommend an increase if, in their opinion, an undertaking's reserve fund was of a reasonable amount. Where a substantial reserve existed it should be used, but not depleted, before authority for increased charges could be given. Increases should not be automatic.

After mentioning that increased coal costs are not the sole reason for the necessity of increased charges (there are also damage by enemy action and evacuation), the Council says that in September, 1940, the Prime Minister said that assistance to local authorities needing it would take the form of an interest-free advance to be repaid after the war, if the Government required it in the light of financial circumstances then prevailing. This assistance is given to the general rate fund, not directly to trading undertakings, but with the approval of the Ministry of Health it may include sums transferred from the fund to discharge revenue deficiencies of trading undertakings insofar as those undertakings' reserves are insufficient for the purpose.

A National, not Local, Burden

The Council, while fully appreciating the Commissioners' views, is still concerned for the financial position of undertakings which are compelled, through no fault of their own to utilise their reserves, perhaps to an extent which may act detrimentally to development after the war. The Council strongly supports the contention of the Association of Municipal Corporations that any financial loss due to the war should be a national, not a local, charge and reserve funds should not be utilised for making good losses over which undertakings have no control.

The Council has agreed in principle to the appointment of a director of the Association but no decision has yet been made.

It is considered that the avoidance of gas and electricity rationing was due in no small measure to the arguments put forward by the National Gas and Electricity Committee and reference is made to the success of the Fuel Economy Campaign. A Technical Sub-Committee has been set up and at the request of the Ministry of Fuel and Power certain undertakings are to furnish comparative figures of consumption for various classes of consumers for the years 1941-42.

In an endeavour to clear up anomalies a Special Joint Committee of representatives of the various supply associations has been set up to consider existing trading relations between authorised undertakers and the Central Board and between authorised undertakers themselves. Several meetings have been held but no definite conclusions have been reached.

After discussions with the Central Board on the subject of plant maintenance the Joint Committee of Electricity Supply Associations has asked its constituent bodies to recommend their station-owner members to engage to the fullest possible extent in schemes of mutual aid which will accelerate the completion of the annual overhaul of generating and boiler plant in the order which will best serve the national interests in the coming winter.

Post-War Plans

At the suggestion of the Joint Committee representatives of the constituent associations were appointed to a committee to deal with post-war reconstruction and kindred matters. As there has been delay in the functioning of this committee a special committee of the Council, consisting of five local authority and five engineer representatives, has been set up and is to prepare a definite policy for consideration by the Association.

The scheme agreed to at the 1939 general meeting will be reviewed in the light of present circumstances and any revision or amendment agreed upon by the Council will be submitted to the Association before any definite action is taken.*

Brief reference is made in the report to alternative tariffs, war damage, coal-wagon demurrage, contract price adjustments, meter standardisation and the employment of women in power stations. With regard to the last matter the Council again urges members to employ women to the maximum possible extent.

The accounts show a satisfactory financial position.

The report concludes with a review of the activities of the Conjoint Conference, E.D.A., E.R.A. and the E.A.W.

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* This scheme (see *Electrical Review*, June 16th, 1939, p. 877) suggested that the Electricity Commissioners should be placed in charge of reorganisation and that they should act through thirteen area committees which would make recommendations to the Commissioners upon the operation of undertakings in their areas.—*Editors, Electrical Review.*

Consumers' Records

A Speedy and Efficient System

By P. D. A. Oliver, F.C.I.S.

A MODERN system of office records is a great help in the effective selling of electrical service. This is no doubt fully realised, but it will be found that, even in the offices of undertakings that are most up to date in other respects, the methods in operation for keeping records of consumers' installations, meter readings, etc., have not received the attention needed to modernise them. However efficient and labour-saving a modern system may be, the difficulty is to scrap a method or apparatus that is working satisfactorily. In Portsmouth, although the question of a revision had been under consideration for a number of years, probably nothing would have been done yet had not all the records, books and equipment been lost by enemy action. It is therefore thought that a description of a system adopted in that city may prove of wide interest.

With an open mind, all types of modern equipment were considered—card records, loose-leaf books, etc. Three main points were kept in mind:—(*a*) simplicity, (*b*) easy reference, and (*c*) labour saving. It was decided that the visible card system would best meet these requirements so far as the consumers' records were concerned, and consideration was given to the meter readings being incorporated with the system.

Before going further perhaps a few details of the "Roneo" visible-card system, which was finally adopted, would be opportune. The apparatus consists of the usual steel cabinet containing trays in which lie the cards giving ¼ in. visibility for the title strips. The metal card holder is of a special type which allows the card to be inserted easily but prevents its removal except by deliberate intention. The holder acts as a hinge for the card and operates in the grooves formed by the flange on each side of the tray.

The trays used in the Portsmouth system are of a special type, with an extra removable tray on the left-hand side containing the reading cards. The consumers' record cards are placed on the right-hand side of the trays. It will thus be seen that a complete record relating to each house or other premises is available. The cards lie side by side and those for any particular premises are quickly found.

Above: The simple, quick-reference system of consumers' records used at Portsmouth. Left: A meter reader receiving her instructions. The left-hand side of the tray is a removable panel containing the cards on which meter readings are recorded

Each consumer's record card gives particulars of date of application, connection, disconnection, details of meters, supply, service, floor area, etc., and of all apparatus on hire at the premises. This card replaces four separate records previously kept.

The reading card gives a summary of the standing charges, meter numbers, floor area class, voltage, space for the readings of twenty quarters and cash columns for pricing. The capacity of each tray is sixty-five cards. When reading of the meters is to start, the trays containing the reading cards are removed as required from the cabinets and handed to the meter readers who record the index and consumption directly on to the cards. As the readings are completed the trays are sent to the various sections of the accounts staff for preparation of the quarterly bills. Each meter reader carries on her bicycle a case holding three trays of cards.

The system is understood to be the first of its type in the country, but it has already proved its efficiency, speed of operation and comprehensiveness. Another great advantage which may be mentioned is the ease with which attention can be called to particular points by means of coloured signals.

Construction of the " Roneodex " cabinets in the form of a double steel wall with air space between offers considerable protection against damage by fire. The cabinets are placed on steel tables, and therefore the only combustible material is the cards. As added protection against incendiary bombs the cabinets have been enclosed with " Durasteel," hinged sheets of this material being also brought down in front of the steel doors of the cabinets when they are swung into place at night.

The further precaution is taken of photographing the cards on 16 mm. film periodically so as to be able to reproduce any cards lost from further attention by the enemy.

Public Service Transport

Review of Association's Activities

IN a résumé of the activities of the Public Service Transport Association for presentation at the Association's annual general meeting this week Mr. R. Stuart Pilcher, C.B.E., vice-chairman of the Council, says that as in previous years the membership of the Association has continued to expand. New members have come from all three chief classes, *i.e.*, company operators, municipal operators and manufacturers. Mr. Pilcher emphasises that the constitution of the Association, which provides that membership shall be open to the various sections of the road passenger transport industry, is one of the fundamental characteristics of the new Association which it is proposed to form.

Valuable work has been done by the New Vehicles Sub-Committee (comprising representatives of the Association and other organisations). The committee has not only made efforts to secure the production of the greatest possible number of new vehicles under present conditions, but also to ensure that the vehicles are well suited to perform the arduous duties required of them.

In connection with the negotiations regarding war damage to public utility undertakings, a second joint memorandum has now been submitted to the Treasury by the Association and the Municipal Passenger Transport Association. With regard to wear and tear allowances for taxation purposes, agreement has been reached with the Board of Inland Revenue for the continuation of existing rates for a further experimental period of two years in the case of motor omnibuses (other than light wartime 32-seater vehicles) and trolley-buses.

The five operators' organisations have considered what revision they would desire to secure in the dimensional regulations governing public service vehicles, as part of a post-war plan for the industry, and a joint committee has been set up. A memorandum has been submitted to the Society of Motor Manufacturers and Traders, and negotiations are proceeding.

With regard to the suggestion by the Ministry of War Transport that the industry should experiment with articulated passenger vehicles as a contribution towards solving the wartime vehicle shortage, representations have been made for an increase in the speed limit from 20 to 30 MPH. The Ministry has so far refused to make the necessary amending regulation, but the matter has again been raised.

Proposed New Association

The purpose of an extraordinary general meeting convened to follow the annual meeting was to secure the approval of members to the voluntary winding-up of the Association. This step is being taken in furtherance of the proposal to merge the Association and the Omnibus Owners' Association in a new Public Transport Association, Inc.

Mr. Pilcher, reviewing the events leading up to the proposal, states that on a number of occasions the two Associations have taken common action and it has seemed clear that the possibility of effecting closer working should be examined. Accordingly the two Associations appointed sub-committees to explore the matter and as a result the proposed scheme of fusion has been formulated. The aim has been to provide for an organisation which shall be fully comprehensive in scope and with powers to take action to watch over, promote and encourage the interests of owners and operators of systems of road passenger transport of all types. The Councils of the two Associations have approved the scheme as a most important step towards safeguarding the prosperity of the industry.

Details of the classes of membership were given in the *Electrical Review* of January 8th last. They make it practicable for all present members of the P.S.T.A. to be included either as members or as representatives of members, and the annual subscriptions are to be the same. It is hoped that membership of the new Association will be available from July 1st. Arrangements for the winding-up of the two Associations include the payment of £2,750 to the retiring secretary of the Omnibus Owners' Association as compensation for loss of office.

Domestic Development

Heating and Other Applications

A RECENT article on the prospects which lie before the electricity supply industry (*Electrical Review*, June 11th, concluded with a reference to the statement by Major Lloyd George that all future homes should be equipped for both gas and electricity. This, contrary to other pronouncements, appeared to envisage a continuance of competition between the two industries for the public favour.

It is admitted that for heating gas can put up a good case, and it is therefore to this use of electricity that most attention needs to be directed. The heating of buildings might well form the subject of comprehensive laboratory experiments, especially in connection with the prefabricated houses which are being planned for erection after the war and which, owing to their method of construction, are likely to have considerably lower heat losses than existing houses. Off-peak heating and heat accumulation will certainly find increasing use, but probably until some satisfactory way of storing electricity or heat in large quantities is discovered, it will be impossible to take the whole of the available heating load.

If electricity is to be used for heating and, contrary to the opinion of some, there are many "pros" to balance the "cons," all the circumstances must be considered. Comparisons should not be on a purely thermal basis and new methods of selling electric heat must be devised

More will no doubt be heard of suggestions that bled steam from generating station turbines should be utilised as a means of providing heating in the neighbourhood of the power station, but this could only be done on a limited scale and at the expense of consumers of electricity.

Gas for Generating Electricity

A number of other proposals have been made entailing the use of town's gas instead of coal for generating electricity. As the efficiency of gas production by the high-temperature carbonisation of coal of high calorific value is not very different from that of electricity production from low-grade coal, the overall thermo-dynamic efficiency of the process envisaged would be reduced by about half. There would remain the problem of finding a market for the additional coke and also for the lower grade coal now used in electric power stations. From the commercial aspect, after making due allowance for capital charges, maintenance and labour on the gas plant, the cost of the fuel would be appreciably more than it is at present.

Low-temperature carbonisation of coal, with the use of semi-coke as well as the gas produced, presents a much more favourable scheme, provided satisfactory prices can be obtained for by-products. This method, however, has been adopted at only one public generating station, which formed the subject of an I.E.E. paper (E. H. Smythe and E. G. Weeks), in 1929.

To return to the question of heating: in theory, from the electrical industry's point of view, there should not be any coal fires. The domestic coal market to-day consumes some 30 million tons a year (a larger amount than is consumed by the whole of the electrical industry) and it is interesting to conjecture as to the probable effect of the electrical industry's taking over the whole of the heating load. It has been suggested that it might actually improve load factor. Another point worth pondering on is the statement that if the high-priced coal were not sold for domestic fuel the price of inferior coal for generating electricity would have to be raised very substantially.

Regarding the commercial side of electric heating, it is fairly safe to say that unless it is possible to reduce charges the great progress visualised in some quarters will not be attained. From the point of view of undertakings receiving bulk supplies the heating load, under existing maximum demand charge arrangements, is treated somewhat with suspicion, as it is almost always in cold spells that the peak load occurs. One engineer has even suggested the introduction of a fixed charge per kW of fires installed in order to limit the undertaking's liability. His attitude is that people who cause maximum demand troubles should pay for them, and moreover that undertakings have to spend a lot on distribution just to meet the demand for a few extra kW in winter. If, therefore, it is desired to encourage electric heating there would at least seem a strong case for altering the basis of charging for bulk supplies.

Cooking and Water Heating

Whatever may be the opinion about electric heating, there is general agreement in the industry as to the desirability of going all-out for the cooking and water heating loads, both of which are regarded very favourably. Washing machines are not a very attractive load owing to their short period of use, but a big future is foreseen for refrigerators which merit a place in every home, both for health reasons and on account of the way they

facilitate catering and prevent waste of food. The market for these has scarcely been touched. Probably 50 per cent. of the pre-war cost of a refrigerator was for the case. With mass production and built-in construction there does not seem any reason why, if, as was the case before the war, a complete radio receiver, a more complicated apparatus, could be sold for £4, a refrigerator could not be placed on the market for only very slightly more. Electric irons and vacuum cleaners have already proved their worth, and are in use in large numbers, and there should be a good opening for small kitchen mixing machines.

Adequate Installations

To prepare for the inevitable demand for more electrical apparatus in new houses, it is to be hoped that those responsible for the wiring installations will see that they are adequate from the start. Since the cost of wiring is only one-quarter to one-half that of the electrical appliances installed it seems reasonable to spend a little extra to make a good job of it, for it is much more expensive to make additions and alterations later on. Under-eaves wiring because of its low initial outlay and because of the ease with which the wiring can be altered to suit any particular installation may facilitate the provision of services in certain cases. Advocates of free wiring consider that it is poor policy to spend thousands of pounds putting mains along a street and then object to spending a comparatively negligible sum on laying a few yards more; and that the granting of free services for reasonable distances not only encourages supplies but reduces office work.

Apparently both because of cost and because of the modern trend of design much more apparatus is likely to be incorporated in the houses of the future, not only cookers, refrigerators, fires and lighting fittings, but the vacuum cleaning plant, too, will be built in. Any advance in this direction is to be welcomed, if only because of the elimination of the cause of probably 90 per cent. of failures of electrical apparatus, namely, the flexible connection. There is also a tendency towards employing miniature circuit-breakers instead of fuses, though their present cost is rather against them, and there is plenty of room for improvement in the location of meters, fuse boxes, etc.

Hire and Hire-Purchase

Apart from the bare installation, if consumers are to be properly encouraged to make full use of electrical appliances, these must be made available on attractive terms framed to suit the less well paid. To-day hire-purchase rather than hire schemes are favoured, but there are some engineers who consider that still greater inducements are necessary. As a development of his undertaking's " free " cooker scheme, one engineer, for instance, has a scheme covering a complete installation including the wiring, a cooker, water heater, radio set, iron and 1½-kW radiator, the whole being paid for by means of a two-part meter (6d. per kWh up to 800 kWh and 1d. per kWh over 800 kWh). The average price to the consumer works out at less than 1½d. per kWh, and the cost of the installation (£30 to £40) can be recovered over a period of seven years, the whole accounting system being extremely simple.

After the war development propaganda will need to be carried out on scientific lines by means of specially trained staffs and advertising schemes might well be better synchronised than they were before the war.

The rapidity with which the foregoing anticipated development will be achieved will to some extent be bound up with, among other things, the standard of living to be adopted after the war. Conditions will depend on what proportion of the national income will be available for spending on consumer goods, and at the moment that cannot be foreseen.

South American Trade

ACCORDING to the Central Bank of Argentina local manufacturers have not yet found it possible to solve certain technical difficulties in connection with the production of some highly specialised articles such as enamelled wire and bare wire of very small diameter, which is of importance in manufacturing and reconditioning electric motors, and in the high-voltage cables required for the extension of electrical distribution networks. Judging by the allocation assigned by the United States for the first quarter of 1943 it is thought to be almost certain that requirements of these materials will not be covered, and that some difficulties will be encountered if the problems which prevent the total manufacture of the articles in question are not in the meantime overcome.

The Federal Council of Foreign Trade in Rio de Janeiro has appointed a committee to inquire into the possibility of manufacturing radio sets and accessories in Brazil.

The Chilean Government has been informed that priority rights have been granted by the United States authorities for the export of machinery for the hydro-electric developments on the rivers Laja and Cachapoal which are to be carried out by a department of the Chilean Government.

In spite of the difficulties due to the war in obtaining up-to-date information, the twentieth edition of the " South American Handbook " is still a work of reference invaluable to manufacturers and exporters of goods, and covers almost everything that the trader will want to know regarding the various countries of South America. Reference to the contents is greatly facilitated by a comprehensive index, and there are also alphabetical and trade classification indexes of advertisers. A coloured map of South and Central America, Mexico and Cuba is also included. The handbook is published by Trade & Travel Publications, Ltd., 14, Leadenhall St., E.C.3, at 3s. 6d. net (4s. post free).

Prospects in New Zealand

Forecast of Remarkable Developments

THE rapid progress of electricity in New Zealand in recent years and the even greater expansion to be expected after the war formed the subject of the presidential address of Mr. A. O. Glasse, M.C., M.I.E.E., chief engineer of the Auckland Power Board to the New Zealand Institution of Engineers.

Mr. Glasse, as reported in the *New Zealand Electrical Journal*, commenced with the year 1925 when most of the power boards had started operations. In that year the output was 250 million kWh; by 1941 the figure had increased about seven-fold, to 1,800 million, and the consumption per head had increased from 175 to 917 kWh. The principal causes of this growth had been the greater use of electricity in the home (particularly for cooking and water heating), farm electrification and the changing-over from other forms of power in industry.

Future growth was bound up with the expansion of population, the degree of industrialisation and the standard of living. A combination of expanding population and industrialisation would greatly increase the demand upon the supply undertakings which were already coping with a rapidly increasing load.

Mr. Glasse doubted whether there was a saturation point for the domestic load. Consciously or unconsciously the consumer budgeted his expenditure for lighting, heating and cooking; he paid out for electricity, gas, coal and wood just as much as he felt he could afford. The supply authorities and the electrical retailers took a hand in the matter by educational means, hiring and hire-purchase schemes, and by advertising and good salesmanship. Higher standards of living caused further increases; the enormous and still increasing demand for power for water heating was an instance of this.

Industrial Possibilities

Increase in population alone was not sufficient; it must be supported by a strong industrial framework. Widely divergent views were held on the possibilities of industrialising New Zealand. There were many who believed that if New Zealand and Australia co-operated they would reach a sufficiently high degree of industrialisation.

He hoped that in addition to the normal growth, there would be a greater use of electricity due to greater industrialisation. In the domestic field they should aim at the complete electrification of every home. It should be made possible for everybody to use electricity not only for lighting but also for cooking, heating and water heating. Further large sections of the railways would be electrified and there were still wide possibilities in electro-agriculture.

New Zealand supply authorities had been fortunate in the way the load had been built up on their lines as soon as an area had been reticulated. They had certainly not just sat down and watched the load grow, but there had been no necessity to carry out intensive load-building campaigns and there had been no attempt to embark upon long-term planning on a national basis. Ultimately there would have to be certain activities of this kind, jointly planned by all authorities, with centralised publicity.

Estimate of Future Load

Mr. Glasse confessed that any estimate of the ultimate load could at present be only a guess. In round figures, the present *per capita* consumption was 1,000 kWh per annum while the coal burnt (exclusive of bunker coal) represented a further 2,000 to 2,500 kWh *per capita*. A transfer of the equivalent of from 1,400 to 1,700 kWh from coal burning to the hydro systems seemed reasonable. If the natural increment due to greater usage were added to this a figure of the order of 3,500 kWh per head did not appear to be unduly high. If they aimed at a maximum population of five millions, this represented four million kW at 50 per cent. load factor. Even at that load they would have some margin on their hydro systems for increased uses of electricity.

While two-thirds of the population was in the North Island only one-third of the hydro power was found there. Therefore industries might eventually have to be directed to the South Island.

With regard to steam generation, Mr. Glasse said that there were no steam stations of any size in the South Island, but the combined capacity of the two in the North Island would form a reasonable emergency standby for some years. It was possible, however, that after the less costly hydro-electric schemes had been developed a stage might be reached when a modern steam station, correctly sited with regard to coal, water and load, could supply electricity at a cheaper rate than new hydro schemes.

Mr. Glasse concluded his address with a survey of the organisation necessary to maintain development and to co-ordinate the activities of electricity supply authorities, manufacturers, contractors and retailers. He also stressed the need for effective public relations which involved the fullest co-operation of the staff. The supply industry must fully recognise its social responsibilities.

Forced-Circulation Boiler

Operating Experience in America

REFERENCES have appeared in these columns to the projected use of a La Mont boiler of 650,000 lb. per hr. evaporative capacity as the first forced-circulation boiler to be installed by a public supply undertaking in the United States. Incidentally, it has the largest output of this design yet made, the highest rating previously being a 350,000 lb. per hr. unit by La Mont Steam Generator, Ltd., in a British station. Designed steam conditions are 1,825 lb. per sq. in. and 960 deg. F., and designed efficiency is 89·5 per cent.

The new boiler was put into commission on October 16th last, and some data on the first five months of operation were given in a supplement to a paper read by Messrs. F. S. Clark, F. H. Rosencrants and W. H. Armacost before the American Society of Engineers, from the main body of which paper the following technical particulars have been taken.

Serving a 25,000-kW Set

Existing plant in the power station, which was built in 1923, consisted of five boilers with an aggregate duty of 1,000,000 lb. per hr. and steam conditions of 375 lb. per sq. in. and 750 deg. F., serving two 75,000-kW turbo-alternators. With the aim of increasing output as well as improving overall economy, it was decided to superpose a generating set of 25,000 kW m.c.r. At that loading, the boiler is intended to deliver 620,000 lb. per hr., of which 615,960 is exhausted from the turbine at 400 lb. per sq. in. and 603 deg. F. Of the exhaust, 77,500 lb. is used in two cross-over heaters as a third stage in fuel-water heating; the remainder goes to the reheater in the boiler setting, where its temperature is raised to 750 deg.

After deducting 53,300 lb. for driving the fuel pumps, approximately 500,000 lb. (including steam used for temperature control) is available for the generation of 47,800 kW by the existing turbines. Exhaust steam from the turbines driving the feed pumps is used for the first stage of feed heating, the second stage being provided by steam extracted from the same turbines at 122 lb. per sq. in.

Two fundamental differences from natural-circulation boilers are the inclusion of pumps in the down-comer connections leading from the main boiler to the bottom furnace wall (to ensure the designed volume of circulation) and the insertion of an orifice at the entrance to each tube element where it emerges from the bottom furnace-wall leader (to fix the flow of water at a predetermined proportion of the total volume in circulation). With two 3,500-gal. pumps in service, the total water in the system is circulated in 1 to 1¼ min., equivalent to about three times the full-load evaporation rate. Energy consumed by the pumps is equivalent to 0·3 per cent. of the steam generated.

Percentage heat absorptions with entrance temperatures of gases in deg. F. (in brackets) are: Furnace, 57; radiant superheater, 7·1 (2,100); reheater, 6·9 (1,840); convection superheater, 21·2 (1,610); economiser, 7·0 (890). The absorption by the air heater, 10·2 per cent. (entering gas at 690 deg.), is returned to the furnace *via* the heated air.

Firing is by means of three sets of four pulverised-fuel burners or, alternatively, two sets of four oil burners with the addition of four auxiliary oil burners in the upper wall opposite the superheaters for maintaining the design values of superheat and reheat. Steam-temperature control is obtained by dampers, which regulate the quantity of flue gas passing over the convection superheater; the dampers are automatically controlled in parallel with rate of air flow with automatic readjustment from a thermostat in the steam outlet header. Reheat temperature is automatically limited by injecting saturated steam into the steam line from the reheater. Full superheat, with coal fuel, is designed to be available down to 480,000 lb. per hr., but experience so far is that this figure is likely to be considerably reduced.

"Teething Troubles"

By November 20th the turbo-alternator was carrying 17,500 kW with a boiler output of 480,000 lb. per hr. at 1,725 lb. per sq. in. Higher loading awaits the rectification of defective operation of the by-pass reducing valve under full automatic control. A few other teething troubles have occurred. The original oval gasket rings in the bonnet joints of the principal valves in the circulating system have been replaced by octagonal rings to avoid leaks. One tube failure, a wide rupture due to defective metal, entailed the welding in of a new 5-ft. section; nevertheless, the water level was maintained in the drum until the furnace was partly cooled.

A heat balance drawn up for an output of 425,000 lb. per hr., using coal of 18 per cent. volatile content, gives the following percentage losses: Dry gas, 5·20; hydrogen and moisture, 3·20; moisture in air, 0·14; carbon, 0·5; radiation, 0·46; total, 9·50, these figures indicating an efficiency of 90·50 per cent.

PERSONAL and SOCIAL

News of Men and Women of the Industry

ELECTRICAL engineers who have read of the gallant action of the 155th Field Battery R.A. in Tunisia will be interested to know that **Major Raworth,** the battery commander, is the elder son of Mr. Basil Raworth, director and general manager of the General Electric Co. of China, Ltd. Mr. Raworth (senior) is now in Sydney, Australia, with the British General Electric Co., Ltd., another subsidiary company of the G.E.C.

The G.E.C. overseas organisation figures largely in the news this week, as it was also revealed that **Flg. Officer G. Singleton,** who commanded the second Sunderland flying-boat sent to rescue the air crews stranded in the Bay of Biscay, was a member of the staff of the British G.E.C. in Australia. It was also announced this week that **Mr. E. W. Molesworth,** manager of the G.E.C. branch at Penang, is a prisoner of war in Malaya.

We regret that we omitted from last week's list of Birthday Honours the name of **Mr. L. Mellor,** who was among the M.B.E.'s. Mr. Mellor is area manager for Northern England and Ireland of A. Reyrolle & Co., Ltd., and is also hon. secretary of the North-Eastern Centre of the I.E.E. The award was made for his Special Constabulary work; he is commander of the Felling Division.

Mr. H. E. Upton, a director of Serck Radiators, Ltd., who has been awarded the O.B.E., is a member of the Institution of Mechanical Engineers and the Institute of Marine Engineers. Since 1924 he has been actively engaged in the development of transformer oil coolers, air blast coolers, etc.

No nominations having been received other than those proposed by the Committees of the Installations, Measurements and Transmission Sections of the I.E.E., the following have been elected chairmen of the respective sections:—Installation Section: **Mr. A. G. Ramsey,** O.B.E., B.Sc. (Eng.). Measurements Section: **Mr. E. W. Moss.** Transmission Section: **Mr. T. R. Scott.**

Mr. R. A. Joseph, of the Midland Electric Installation Co., Ltd., Wolverhampton, has been nominated as chairman of the South Midland Students' Section of the I.E.E.

Mr. J. Wooldridge has been appointed cable works manager and **Mr. G. T. W. Whitehead** production engineer of Johnson & Phillips, Ltd.

Mr. Wooldridge, who joined J. & P. in 1934 as works superintendent of the Rubber Cable Department, will now manage both the rubber and the paper cable works of the company. He received his training at the Helsby works of British Insulated Cables, Ltd., joining that company in 1921.

Mr. Whitehead joined the J. & P. Engineering Department in 1915, and after serving in the general engineering shops he became chief draughtsman for that department. He was appointed works engineer in 1937. Apart from his extensive experience in the design and manufacture of cable making machinery and general engineering work he has been largely responsible for the recent design of special equipment for submarine cable paying-out and picking-up gear made by Johnson & Phillips.

Mr. S. B. Donkin, M.Inst.C.E., M.I.Mech.E., M.I.E.E., of Kennedy & Donkin, has been elected chairman of the Association of Consulting Engineers for the year 1943-44. This is Mr. Donkin's second term of office as he was chairman of the Association for 1927-28.

Mr. S. B. Donkin

Mr. Donkin has been a consultant for many years. After education at University College, London, he served a pupilage with Bryan Donkin & Co. from 1891 to 1895 and then acted as assistant engineer to the firm until 1897 when he went as assistant to Professor Kennedy. In 1913 he became a partner in the firm of Kennedy & Jenkin. In the following year he began his association with Kennedy & Donkin of which firm he is now senior partner. Mr. Donkin is a member of the three principal engineering institutions and was president of the Institution of Civil Engineers in 1937-38.

Mr. H. J. Hodges, assistant works manager with W. T. Henley's Telegraph Works Co., Ltd., has been promoted to the position of chief labour officer of the company and its associated subsidiaries, as from July 1st, next. **Mr. A. T. Winder** succeeds Mr. Hodges as assistant works manager.

Mr. J. G. Lancaster, M.Sc., B.E., M.I.E.E., A.M.Inst.C.E., partner in the firm of Vickerman & Lancaster, consultants, Wellington, is the new president of the New Zealand Institution of Engineers. He succeeds **Mr. A. O. Glasse,** chief engineer of the Auckland Electric Power Board, whose address is dealt with on another page.

Lt.-Col. G. R. Harding has been re-elected chairman of the London Chamber of Commerce and **Mr. J. McLean,** vice-chairman.

At the last meeting of the Electrodepositors' Technical Society, **Dr. J. R. I. Hepburn** was elected president for the ensuing year.

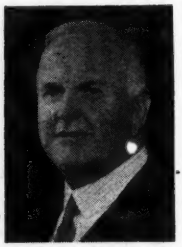
Mr. James Wink, Aberdeen branch manager of the General Electric Co., Ltd., retired at the end of May after thirty-one years' service with the company. Mr. Wink is a native of Glasgow and joined the G.E.C. at its Glasgow branch. He went to Aberdeen a year later to open in that town the second of the company's branches in Scotland. He has received many expressions of goodwill and wishes for happiness in his retirement from numerous friends and associates. Among these was a presentation from the local Electrical Contractors' Association and a silver

tea service from Mr. A. H. Railing, chairman of the G.E.C. Mr. A. S. Black, manager of the G.E.C. Scottish branches, made the presentation on Mr. Railing's behalf and at the same time one on behalf of Mr. Wink's colleagues in the company.

Mr. Wink will be succeeded by **Mr. G. S. Robertson** of the G.E.C. Aberdeen branch, who has already served for many years at that office.

Mr. H. de A. Donisthorpe has been elected chairman of the Radio Industries Club ; **Mr. A. J. Dew,** vice-chairman ; **Mr. W. E. Miller,** hon. secretary; and **Mr. H. A. Curtis,** hon. treasurer. **Sir Noel Ashbridge** is president of the Club.

It is announced in the annual report of Venner Time Switches, Ltd., that **Mr. Ernest E. Sharp** has ceased to be qualified as a permanent director and retires at the annual meeting on June 22nd. Mr. Sharp does not offer himself for re-election and the board proposes that the vacancy shall not be filled in the meantime. During last year **Lord Falmouth** and **Mr. C. A. Davis** resigned from the board and their places were taken by **Messrs. A. A. Rowse** and **W. H. Lawson** who offer themselves for re-election at the annual meeting. Mr. Rowse has been elected chairman, **Mr. J. M. Brooke,** managing director and **Mr. Leslie C. Sharp,** sales director.



Mr. E. E. Sharp

Mr. W. E. Pott, chairman of E. Dawson Lamp Factors, Ltd., informs us that he has disposed of his interest in that company, which took over the business founded by Mr. Pott in 1914-15.

At the annual meeting of the Ayrshire Electricity Board held at Kilmarnock **Provost T. Murray,** Ayr, was unanimously reappointed chairman.

The Rhondda Urban District Council has agreed to adopt the A.M.E.E. scale of salaries for **Mr. T. R. Evans,** M.I.E.E., the electrical engineer and manager. Mr. Evans is group leader of several undertakings under the mutual aid scheme of E.D.A. He is on the executives of the Western Centre of the I.M.E.A., and the local centre of the I.E.E., and is hon. secretary of the Bulk Supply Association of South Wales and Monmouthshire.

Mr. W. Green, who has retired from the position of mains superintendent to Colne Corporation Electricity Department after thirty-three years' service, has been presented by his colleagues with an electric blanket. **Mr. L. Ingham,** mains assistant with Colne Electricity Department, has succeeded Mr. Green as mains superintendent.

Mr. J. P. Wolfenden, M.Sc., lecturer in electrical engineering at Burnley Technical College for four years, has been appointed head of the Electrical Engineering Department of Rutherford College, Newcastle-on-Tyne. Mr. Wolfenden, who is only twenty-nine, graduated at Manchester University.

Obituary

Mr. S. Mavor.—We regret to report the death on June 11th, at the age of eighty, of Mr. Sam Mavor, the distinguished Scottish engineer and a pioneer in the application of electricity to coal mining. Mr. Mavor was the sixth son of the Rev. James Mavor, M.A.; he was educated at Glasgow Private School and the Glasgow Royal Technical College, later serving an apprenticeship with R. E. Crompton & Co., from 1881 to 1886. He joined his brother in the firm of Muir & Mavor in 1887 and until his death was chairman of Mavor & Coulson, Ltd., which was formed in 1897 to take over the existing business of the same name.

Mr. Mavor was a man of wide interests and took an active part in Scottish public affairs. He was a J.P., a governor of the Glasgow Royal Technical College, the Glasgow School of Art and the Western Infirmary, Glasgow, and a director of the Glasgow Eye Infirmary and of the Glasgow Chamber of Commerce. He was also a past-chairman of the Scottish Centre of the I.E.E., the Mining Institute of Scotland and the North-Western Engineering Employers' Federation. In the course of his long life he produced many papers on electrical, mechanical, mining, geographical and other subjects.

Private A. S. Gurney, who has been posthumously awarded the Victoria Cross for conspicuous gallantry at Tel el Aisa, where he was killed in action on July 22nd, 1942, was an employee of the Perth (W.A.) Electricity & Gas Department.

Wills.—Lord Hirst, chairman of the General Electric Co., Ltd., left £498,650, with net personalty £381,853. He left £1,000 to the R.A.F. Benevolent Fund, £500 to the Worshipful Company of Glaziers, and after other bequests, the residue as to two-fifths upon trust for each of his daughters and one-fifth upon trust for his granddaughter, Pamela M. Colyer.

Mr. R. W. Paul, M.I.E.E., the well-known instrument maker, who died in March last, left estate valued at £215,456 (net personalty £211,547). In his will he directed that an "R. W. Paul Instrument Fund" should be formed from the proceeds of the sale of his shares in the Cambridge Instrument Co. "for the design, construction and maintenance of novel or unusual instruments for investigation in physical science." He also bequeathed, on the decease of his wife, £5,000 to the Royal Institution Research Fund and £500 each to the Benevolent Funds of the Institution of Electrical Engineers and the Institute of Physics and the Cinematograph Trade Benevolent Fund.

Lord Gainford, a former Postmaster-General and chairman of the B.B.C., and a chairman or director of the County of London Electric Supply Co., Ltd., the South London Electric Supply Corporation, Ltd., and other supply companies, who died on February 15th last, left £25,268 (net personalty £11,281).

Mr. Rollo Appleyard, the well-known physicist and cable engineer, whose death occurred on March 1st, left £2,536, with net personalty £2,442.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Motor Standardisation

MR. SOFIANO, in his letter published by you on June 4th, seems to commend my proposals from a commercial point of view while at the same time deploring the attempt to standardise motor dimensions as being unsound on engineering grounds.

If your correspondent will read my paper carefully he will find that none of the points he raises has been overlooked. Special motors for special purposes will always be required, and more often than not will be built into one or other of the standard frames proposed, just as they are now usually built into one or other of the standard frames of the particular manufacturer. My proposal deals alone with ordinary industrial machines which comprise far the greater part of the output in the range specified. Special applications do require "careful consideration and expert calculation," but this is not what we are talking about.

Your correspondent suggests that a good machine and good control equipment will always give trouble-free service, and that interchangeability is not necessary. He rules out accidents and disregards facts. If the case were as he states, breakdown insurance rates would be lower and the maintenance contractor with his positive record of breakdown percentages would disappear.

Finally, your correspondent draws a terrifying picture of the stagnation, arrest of progress and other evils which would ensue if "healthy competition" in what amounts to no more than overall and fixing dimensions were eliminated.

Are we really frightened? Or is it perhaps that some of us are just lazy?

*London, E.C.*1. H. MARRYAT, M.I.E.E., M.I.Mech.E.

I.E.E. Graduates

MY attention has been called to a letter from "Seven I.E.E. Graduates" which appeared in your issue of May 7th. The Council of the A.Sc.W. recently passed a resolution urging the setting up of a Central Scientific Appeal Board to deal with cases arising under the Essential Work Order involving the appointment of qualified and unqualified scientists, in view of the unsuitability of the average appeal board to deal with such cases.

The Association is seriously concerned at the failure of Government Departments, no less than of private firms, to make full use of the technical and scientific qualifications of its members. That in the present stage of the war well-qualified scientists should be devoting all their time to routine jobs which might easily be performed by boys with no higher qualifications than the General Schools Certificate gives rise to serious apprehension about the thoroughness of our war effort.

Already some firms appear to be planning for after the war and therefore refusing to release qualified men who might be doing useful war work with another firm because that firm may prove a competitor in post-war trade. It is difficult to prove the motive actuating a firm in its refusal but this Association is fully alive to the importance of helping its members to make their maximum contribution to the war effort and is always ready to assist its members to transfer when the evidence justifies this course.

73, *High Holborn, W.C.*1. REINET FREMLIN, *Secretary*, Association of Scientific Workers.

THE experience of the "Seven I.E.E. Graduates" and their colleagues with the Central Register further proves previous correspondents' complaints in your columns and elsewhere. In your leader on "The Institution" (June 4th) you say:—"At the present time two broad aspects call for continuous attention. The first relates to the prosecution of the war and the second (where it is of immediate import) to war's aftermath. In both the task of the Institution is to present the electrical engineering standpoint, not in any narrow professional sense but with the aim of ensuring that its members are allowed to give all that is in them to advancing the national purpose.

"There can be no doubt of the inestimable value of the expert advice given to the Government in the placing of electrical engineers so that their skill and experience may be most effectually engaged, whether in uniform or out."

Since the I.E.E. renders technical advice to the Central Register, could not the former assist its members in complaints made, *e.g.*, that of the "Seven I.E.E. Graduates"?

If these Graduates and their colleagues, who come under an Essential Work Order, are desirous of obtaining release, they should consult the National Service Officer.

Since the purpose of these Orders is to ensure a proper supply of labour for jobs vital to the war effort, workers who feel they are not being properly used where they are working have the strongest case for discharge.

It is highly desirable to obtain assistance

and guidance from an appropriate trade union which could present their case. From their first letter, it seems that the most suitable union for them to join is the Association of Scientific Workers, 73, High Holborn, W.C.1.

" MISUSED."

Standard Electric Vehicle

THE article on this subject in the *Electrical Review* of June 4th, coupled with the restrictions on petrol, suggest that the electrical industry can hope for the rapid development of the electric vehicle. The drawback to any development centres on the storage battery. Surely a body such as the Accumulator Manufacturers' Association is in the best position to tackle this problem.

May I suggest consideration of an idea which has been put forward before. Under this scheme each town would have one or more service and charging stations under the supervision of the A.M.A. At this station battery vehicle owners could, towards the end of a run, have their battery exchanged for a fully charged one, leaving the exhausted battery to be recharged and passed on to other users. The batteries would be the property of the A.M.A., the first cost being covered in the initial cost of the vehicle. The charge for an exchange at the service station would cover the recharging and the interest and depreciation on the battery.

The batteries would be maintained under the supervision of the A.M.A. and trained servicemen at the selected stations, being replaced or replated when they fell below a prescribed capacity test. This replacement would also be covered by the " exchange " charges.

Hitchin, Herts. C. HEYS, Grad. I.E.E.

Rewinding Armatures

AS constant readers of your correspondence columns we have been interested in the letters appearing under the above heading.

We are astounded, however, by " Works Electrician " (May 28th issue) when he states: " These drills were idle for nine months on a previous occasion because the management could not get a firm to rewind them."

Surely a glance at the " Work Wanted and Offered " columns in your journal would have revealed many firms like ourselves with a capacity for armature winding, who would be willing to undertake the work and give early delivery ?

Should your correspondent care to get into touch with us we may be able to enlighten him on the question of service.

Burnley. ELECTRIC FACILITIES (BURNLEY), LTD.

Gas-Electric Co-operation

Mr. E. V. Evans's Views

IN the course of his address at the annual meeting of the Institution of Gas Engineers last week, Mr. E. V. Evans, the president, dealt with the subject of co-ordination of the gas and electricity supply industries.

He said that the physical differences between the two great industries should form a sound basis of co-operation with a view to securing the improved utilisation of fuel at the least possible cost to the consumer. Unrestricted competition on lines that were commonly followed before the war could easily lead to the cost of both services becoming excessive.

Dealing with the cooking load, Mr. Evans said that if this poor load-factor business were transferred from gas to electricity the result would be an increase in the cost of gas on account of the lower consumption per head while the price of electricity would rise at the same time owing to the costliness of a load of such an intermittent nature. In this direction co-operation between the two industries would lead to improved load factors for electricity with increased consumption per consumer and to reduced gas costs by an increased consumption per consumer.

Both gas and electricity had cases to state and at an appropriate time it would be necessary for them to submit these cases to the impartial judgment of an authority whose duty it would be to see that complementary development took place in the best interests of the public. The practical realisation of co-operation on an economic basis must depend on the designing of methods of charging which reflected the economic cost of supply.

He claimed that the gas industry had fulfilled its obligations to the public; otherwise it might have been justly said that it was due to be superseded. As it was he claimed that gas development on a much greater scale than hitherto would confer great benefits upon the community.

Mr. Evans expressed the opinion, supported by statistics, that the sale of both gas and electricity could be three or four times the pre-war figures at prices lower by 30 or 40 per cent.

Installations Section Luncheon

Domestic and Industrial Aspects

THE first informal luncheon of the Installations Section of the Institution of Electrical Engineers, now completing its second year of existence, took place last week at the Connaught Rooms in London. Mr. R. Grierson, Section chairman, presided over a large gathering and proposed toasts to the president and several past-presidents who attended.

Professor C. L. Fortescue (the president) remarked that he could not turn his mind back to the formation of the newest of the I.E.E. Technical Sections without seeing how much Mr. H. T. Young had had to do with the lusty growth of the infant. Apart from a membership of over 1,500, the Section attracted the second largest average attendance at its meetings, which was the real measure of its success. One of Mr. Young's first objectives in forming the Section was to help the war effort; how well its members had responded was evident from the subjects dealt with at meetings, while many of its members were serving on important committees and the amount of work being done could be properly appreciated only by those in direct contact therewith.

Contemplation of the future seemed to indicate that the newest I.E.E. section had properties that differed from the others. It appeared to be more like those smaller organisations which divided in half, forming separate entities with two distinct parts to play; one of them industrial and the other domestic, involving different outlooks. The many houses to be built after the war would contain much more equipment than those of the past had done. If users were to be satisfied they must not have to "send for a man because the flex had broken," which meant that the reliability of appliances in household service required attention. Members of the Section would consequently need to concern themselves not only with installation, but also with research into ways and means of avoiding difficulties in the home as well as in the factory.

A peculiar problem of exceptional interest on the educational side related to the conscientiousness with which work was done by skilled and semi-skilled operatives. Only education of a curious kind, which took psychological factors into account, would teach them that a job well done was not only a source of pride, but also of benefit to themselves, and not merely done for the sake of the weekly pay-packet.

The president concluded by proposing the health of the chairman.

Supervising Electrical Engineers

Association's Annual Meeting

THE annual general meeting of members of the Association of Supervising Electrical Engineers was held at Aldwych House, London, W.C.2, on May 22nd.

Mr. W. H. Brooks, chairman of the Association, presided over a good attendance which included delegates from provincial and London Branches. At the beginning of his address, he referred to the work done by the supervising electrical engineer in connection with the war effort; the amount of work that supervising engineers had taken over was, he commented, a matter for pride, but the Executive Council noted with some misgivings cases of overstrain which had been followed by breakdown of health.

Branch Activities

Turning to branch developments, the chairman referred to the continued good work being done despite travelling difficulties, long working hours, etc., mentioning particularly the interest in technical matters and the many suggestions put forward on these and administrative matters for the consideration of the Executive Council. A large and varied amount of work had also been done by the various committees, which had dealt with such subjects as apprenticeship, establishment of a standard of competence of electrical foremen and supervisors, and many aspects of post-war reconstruction in connection with which work was going forward on a sound practical basis leading to concrete constructional proposals placed before the proper authorities. The educational needs of members returning from the Forces had not been overlooked. The chairman stressed the importance of realising the position in relation to the younger generation and the need for setting standards of pace, and of good practice and qualifications, to meet the challenge of the years to come.

The annual report of the Executive Council, the treasurer's statement of accounts and the auditors' reports, all of which testified to a successful and progressive year and a sound and improving financial position, were adopted and the following were then elected to fill five vacancies on the Executive Council: Messrs. W. H. Brooks, J. D. Griffiths, E. K. Guy, A. W. Jervis and J. W. Noble. Motions carried at this meeting included one in support of the Beveridge Report on Social Security and, as regards the Association's work, an expression of approval of the five-year plan for branch development, comprising, in brief, a plan for organised expansion.

Presentation to Mr. Brammer

A pleasing interlude in the proceedings was the presentation, by the chairman on behalf of the Executive Council and past chairmen of the Association, of an inscribed silver cigarette box as a mark of respect and esteem to the general secretary, Mr. A. Brammer, who had completed his twenty-first year of service with the Association during the year under review. Mr. Brammer made a suitable response, expressing his thanks for a surprise presentation which he would value highly

as a memento of an important period in the history of the Association.

The vice-chairman, Mr. J. Flood, moved a vote of thanks to Mr. Brooks, which was carried with acclamation, and the meeting terminated on a note of quiet confidence in the future progress of the Association, coupled with determination to press forward its aims, not only inside the electrical industry but in furthering the present effort towards lasting peace.

Re-election of Officers

At the first meeting of the Executive Council of the Association held at Aldwych House on June 5th the following principal officers were re-elected for the year 1943-4:—Chairman, Mr. W. H. Brooks; vice-chairman, Mr. J. J. Flood; and hon. treasurer, Mr. J. J. Smith.

Parliamentary News

From our Special Reporter

Electricity in Scotland

THE Hydro-Electric Development (Scotland) Bill seems assured of a speedy passage into law. It was read a second time in the House of Lords on June 9th to a chorus of approval on all hands. Peers of all shades of opinion welcomed it, and especially did they appreciate the action of the Secretary of State for Scotland (Mr. T. Johnston) in having met them beforehand and explained the provisions of the Bill.

There were hints that there might be attempts to amend the "amenity" clauses when the Bill was considered in Committee.

Utility Radio Sets

On June 8th in the House of Commons Mr. De la Bere asked the President of the Board of Trade what progress had been made in the design and manufacture of the utility radio sets; and whether he was now in a position to make a pronouncement as to the date when they would be available to the general public.

Mr. Dalton said that 90,000 domestic wireless sets were still in process of manufacture, and these should be completed and released during this year. In addition to this, arrangements had been made to import supplies from the United States for early delivery. He had decided that, after the sets in process of manufacture had been completed, any new domestic sets made here should be of simple standard designs. Discussions on this were now proceeding with the trade. No sets of this type could be available until next year.

Radio Research

Rear-Admiral Beamish asked the Minister of Production how the scope of research in radio electronics and expenditure thereon by the Post Office, the British Broadcasting Corporation, Cable and Wireless, radio manufacturers and other interests concerned with communications and radio compared with that of United States interests; and whether he proposed to initiate comparative developments in this country.

Mr. Garro-Jones, Parliamentary Secretary to the Ministry of Production, said that no details were available of comparable American expenditure and in any case it would not be in the national interest to give particulars of the scope of our own research in the radio field or of the expenditure upon it. He was afraid therefore that it was not possible to make the comparison asked for. A vast amount of work had been and was being done in this field by Government Departments, by the B.B.C. and by industry. With regard to the last part of the question, very close contact was maintained with similar agencies in the United States. The vital importance of this work was fully appreciated.

Reclaiming Porous Castings

MANY metal castings are normally rejected because of their porosity. Valuable time and metals beside much skilled work which are thus wasted, because the minute holes cannot be economically detected until the finished castings are subjected to pressure, can be retrieved by pumping a plastic solution of the bakelite variety into the pores of the metal and then hardening it by baking in an electric oven. Commercial Structures, Ltd., Staffa Road, Leyton, London, E.10, inform us that they are employing this process with success in their own works, where operators are available to demonstrate the method. The Company is prepared to treat castings, or to supply plastic infusion plant (but not electric ovens) and hydraulic machines for testing reclaimed castings. The impregnating machine consists of a hand pump developing up to 5,000 lb. per sq. in. pressure within a cylinder fed with plastic material from a reservoir, which is forced through a flexible hose connector into the casting undergoing treatment. Subsequent hardening takes place at a baking temperature of 85 deg. C. for evaporating solvents, after which it should be controlled at 110 deg. C. for one hour and finally raised to 135 deg. C. for another hour. This method of salvage is said to be applicable to both iron and non-ferrous metals as well as light alloys. Various grades of sealing solution are available for different requirements, a clear fluid being employed for fine porosity while coarser faults need a resinoid solution containing a filler.

Transport in America

STATISTICS compiled by the American Transit Association and published in *Mass Transportation* show that passenger traffic last year attained record proportions, the total of 18,000 million passenger journeys exceeding the 1926 peak by 1,000 million journeys and the 1941 traffic by 4,000 million journeys (or 28 per cent.). Rides *per capita* increased in the year from 182 to 230 and total revenue from $800,340,000 to $1,023,830,000.

An analysis of the different forms of transport indicates that surface and rapid transit lines carried 9,768 million passengers, motor-buses 7,253 million, and trolley coaches 979 million. Although still a small part of the whole, trolley-coach traffic has more than doubled since 1939, when 445 million passengers were carried. Motor-bus traffic has also nearly doubled in the same period, rising from 3,853 million to 7,253 million journeys. Traffic on the surface and rapid transit lines fell from 9,824 million journeys in 1936 to 8,325 million journeys in 1940, but has since recovered to 9,768 million.

COMMERCE and INDUSTRY

Industrial Power Charges.

Electricity Charges and Industry

RECENT correspondence in *The Times* from Sir Arnold Gridley and Mr. P. C. Loftus, M.P., has drawn a comment from Mr. F. A. Rivett (Birmingham Electric Furnaces Ltd.).

Mr. Loftus advocated the unification of electricity charges and lower prices for energy supplied to industrial establishments. Sir Arnold expressed doubt as to the advantages which Mr. Loftus considered would be secured by standardisation of tariffs and said that the average cost of electricity to industrial concerns represented only from 1 to 1½ per cent. of their total production costs.

Mr. Rivett says that this does not apply to industries using electric furnaces. Where electric melting is done, and more particularly the smelting of such materials as ferro-alloys and calcium carbide, the power costs may be in excess of 50 per cent. of the total cost of the product. He says:—"As manufacturers of electric furnaces we are naturally closely in touch with industrial development and know of many cases where it has been impeded or even prevented by high costs."

Sir Arnold has rejoined that he clearly recognises the importance of low prices for electricity for the electro-chemical and electro-metallurgical industries in which the cost of electrical power may, in fact, amount to as much as 75 per cent. of the total production cost. Such cases are, however, few in comparison with the thousands of other industries in which the power costs do not exceed 1 to 1½ per cent. of the total cost of production.

Electrical Production in Australia

Figures published by the Commonwealth Bureau of Census and Statistics show that during the decade from 1930–31 to 1940–41 the value of electrical machinery and apparatus manufactured in Australia rose from £2,169,000 to £8,972,000. The number of factories increased from 231 to 361 and the people employed from 4,098 to 13,128. The principal class of production comprised starting, regulating and controlling equipment, the value of which is given as £781,546. Other leading items were:—Motors, £638,612; automobile and radio batteries, £607,853; refrigerators, £522,811; transformers and convertors, over 20 kVA, £349,843; household fittings, £325,157; and alternators, £10,348.

Hair Waving and Drying Machines

The Board of Trade has published an amending Order which provides that after June 30th manufacturers need not obtain licences under the Electrical Appliances (Control of Manufacture and Supply) Order, 1942, for the manufacture and supply of machines (except hand appliances) for waving or drying hair. Manufacturers should note that licences are still required under the Electrical Appliances (Control of Manufacture and Supply) Order for hand appliances of this type, and under the Machinery Plant and Appliances (Control) (No. 3) Order, 1942, for the supply of machines other than hand appliances. Pressing apparatus of a kind suitable for domestic and personal use, hair clippers and all lighter elements are now added to the list of goods controlled under the Electrical Appliances Order, and manufacturers will therefore be prohibited from making or supplying them after June 30th, 1943, except under licence from the Board of Trade. The Order (S.R. & O. 1943, No. 795) is obtainable from H.M. Stationery Office, price 1d.

Manufacture in Australia.

Factory Lighting Installation

An interesting change-over to modern lighting has recently been carried out in an old established engineering works which under pre-war conditions was able to carry on with a tungsten lighting installation that just sufficed. The machine shops are to-day devoted to essential war production of the precision class, requiring the best available illumination methods, and as power is provided for the main shop by means of central electric drive operating line and countershafting, under tungsten lighting the mass of belts and pulleys and shafting supported on steel gantries caused heavy shadows.

The Illuminating Engineering Department of Siemens Electric Lamps & Supplies, Ltd., collaborated with the contracting engineers, G. Hopkins & Sons, Ltd., in planning a layout of "Sieray" fluorescent tubes. The installation is now operating with complete satisfaction to the executive and operatives alike. The total load for the new lighting is almost identical with that of the old tungsten lighting and local lighting on machine tools is no longer necessary.

Synthetic Rubber Supplies

According to Mr. William Jeffers, the American Rubber Director, the production of synthetic rubber in the United States so far this year had been 25,000 long tons and it was anticipated that the total production for the year would be between 250,000 and 275,000 tons; next year the production would rise to 850,000 tons with about forty plants in operation. This meant that rubber supplies were assured for all the military and essential civilian requirements of the United Nations. Mr. Jeffers pointed out, however, that too great optimism was not justified, for the technique which resulted in the state of perfection in natural rubber products had taken years to achieve while the development of synthetic rubber technique had to be crowded into a few months.

Housecraft at Derby

The Nottingham Road Girls' School, Derby, is the first elementary school in the Midlands to take the Homeworker's Course of the Electrical Association for Women. Twenty-four candidates entered for the examination and twenty-one passed—four with credit.

The certificates were presented by Alderman Mrs. Petty, J.P., who stressed the value of the course to future housewives, and as the basis of many careers. Miss Abbott, the headmistress, was congratulated on having foreseen the need for such special study, and on having provided the necessary facilities. Mr. F. H. Pooles, M.I.E.E., chief engineer and general manager, Derby, expressed his pleasure at the results achieved, and also congratulated the school on its initiative. The students were prepared for the examination by Miss M. Topple, the Derby electricity supply demonstrator.

Shipbuilding and Engineering Inventions

The North-East Coast Institution of Engineers and Shipbuilders has set up a committee of eleven to consider any inventions designed to help shipbuilding and engineering. The Committee comprises Drs. A. Pickworth and S. F. Dorey (Lloyd's Register); Messrs. P. L. Jones and N. M. Hunter (Swan Hunter and Wigham Richardson, Ltd.); Dr. G. S. Baker; Dr. T. W. F. Brown and Mr. L. Batey (Hawthorn Leslie and Co., Ltd.); Mr. W. T. Bottomley (Merz and McLellan); Mr. J. Calderwood; Mr. W. D. Horsley (chief electrical engineer, C. A. Parsons and Co., Ltd.); and Dr. E. V. Telfer, consulting naval architect. The Committee will consider ideas from inventors who are not members of the Institution provided they are introduced by a member.

Aluminium Production in India

The completion of works in South India for the production of virgin aluminium represents the foundation of a new industry in India. Reporting this development, *Indian Engineering* states that credit is due to the Government of Travancore, whose far-sighted hydro-electric policy has resulted in the location of this important new industry within its borders. Eighteen months ago the site of the new works of the Aluminium Production Co. of India, Ltd., covering an area of over fifty acres, was mostly waste land. To-day it is occupied by modern factory buildings which house long rows of electric furnaces; crushing, grinding and calcining plant; laboratories; and a well-equipped hospital and dispensary for the welfare of the staff. The same concern completed the construction of up-to-date aluminium and rolling mills near Calcutta in 1941. Now that the metal itself is being produced in India the country is no longer dependent upon imported supplies, and can look forward not only to providing for internal requirements but also a wide export market.

Spare-Time Work

The Electricity Supply Committee of Colchester Town Council reported to the Council's June meeting that it had had a discussion regarding employees who were engaged in work for profit during their spare time, and had resolved that the matter should be referred to the Establishment Committee for consideration.

Councillor L. M. Worsnop said it was felt that there should be a ruling on the matter. A good deal of comment arose when the Council's employees were doing other work. One employee ran a dance band and a taxi business.

Councillor W. H. Ham considered that a man's leisure hours were his own, and provided there was no interference with his ordinary day's work he had a perfect right to do what he wanted to do.

Alderman A. D. Ward said he agreed with Mr. Ham, but the proper thing was to await the Establishment Committee's decision.

Australian Lamp Company

The *Electrical Engineer and Merchandiser* (Melbourne) reports that Crompton Parkinson, Ltd., have become shareholders in Electric Lamp Manufacturers (Australia) Pty., Ltd. This company was formed in 1930 for the production of electric lamps in Australia. The other shareholders in the concern are the British Thomson-Houston Co., Ltd., the General Electric Co., Ltd., Philips Lamps, Ltd., and Siemens Electric Lamps & Supplies, Ltd.

Engineering Film Show

A film show of general engineering interest is being held by the Nottingham Society of Engineers at the Corporation Gas Showrooms, Parliament Street, at 6.30 p.m. on Monday, June 21st. The president, Mr. S. J. Furse, A.M.I.E.E., will preside and the films will be introduced by Mr. M. A. Crosbie, O.B.E., A.M.I.Mech.E. past president.

Correction

We regret that by a slip of the pen we referred (in connection with the formation of a Wireless Group) to the North-West Midland Centre of the I.E.E. in our leading article of June 4th. There is, of course, no such centre; the reference was to the North-Western Centre.

TRADE MARK APPLICATIONS

THE following applications have been made for British trade marks. Objections may be entered within a month of June 9th:—

PETTER (design). No. 622,358, Class 7. Internal-combustion engines (not for land vehicles), blowers for internal-combustion engines, electric generators, lighting dynamos, portable spraying plants, and pumps (none being for surgical or scientific purposes or air pumps for vehicles), and parts (not included in other classes). No. 620,471, Class 9. Switchboards and switches. No. 620,472, Class 11. Lighting apparatus and appliances. No. 616,021, Class 12. Internal-combustion engines for land vehicles, blowers therefor; and parts (not included in other classes).—Brush Electrical Engineering Co., Ltd., Falcon Works, Nottingham Road, Loughborough, Leicestershire. All the foregoing are to be associated with No. 507,325 (2703) vi and others.

ULTRIC. No. 622,439, Class 9. Fire and burglar alarms, electric transformers, electric bells, distribution boards, electrically operated door openers, cut-outs, relays, electric soldering irons and automatic temperature regulators.—Ultra Electric, Ltd., Ultra Works, Western Avenue, Acton, W.3. To be associated with No. B439,257 (2385) viii and others.

Wire and Metal Gauges

Possibilities of a Standard System

IN a Memorandum on Gauges for Sheet Metal and Wires, which has been issued by the British Standards Institution, the possibility of adopting a standard system of measurement throughout the British Empire and the United States is discussed. The proposal is based on the substitution of direct measurement in decimals of an inch (as in the Whitworth system) for the several numbered gauges now in use, associated with a series of standards for particular materials or industries.

In Great Britain the two legalised gauges are the Imperial Standard Wire Gauge, the most widely used (even for sheet metals), and the Birmingham Gauge (usually restricted to black steel sheets). Other commoner gauges in use in both countries are described. The BG provides an example of a geometric series giving a ratio in an upward direction of $\sqrt[6]{2} = 1{\cdot}1225$, which differs by less than 0·04 per cent. from the International Standard 20-series, for which the ratio is $\sqrt[20]{10} = 1{\cdot}1221$, which is accepted in the United States. The difference between the two in the range from 0·224 in. to 0·004 in., varies from 1 per cent. for the highest values to 3 per cent. for the lowest, differences that are well within the usual tolerance. It is emphasised, however, that it is the gauge numbers that are of importance and not any particular property they possess.

The application of preferred numbers to the diameters of wire is being investigated. For wires the cross-sectional area is the most important consideration in regard to both conductivity and tensile strength. On a 20-series basis there are twenty sizes between diameters of 0·01 in. and 0·1 in. The cross-sectional area of the largest (0·00785 sq. in.) is 100 times that of the smallest wire, which restricts the choice to one-half of that available for thin plates.

Flat-Metal Notation

In the United States standard preferred thicknesses for flat metal, the lower values are given to one significant figure only (though probably calculations will be carried to four places of decimals later). At present 0·0063 is rounded to 0·006—a difference of 5 per cent. If the preferred diameter for a wire were thus rounded, the difference between its cross-sectional area and that of the true preferred number would be over 10 per cent. The SWG corresponds roughly to a 21-series, but as the sizes available are insufficient, wires are sometimes drawn to half- and even quarter-gauge sizes. The first step towards gauge standardisation, it is suggested, might well begin with the SWG and BG. If the SWG sizes from 5 to 42 are written down, leaving a space between 18 and 19, and omitting Nos. 28, 31 and 34, an approximation to within 5 per cent. is obtained to BG numbers 5 to 40.

A point in favour of the United States standard preferred thickness for thin flat metal is that corresponding numbers are recorded in every table of logarithms as those numbers whose logarithms are 0·05, 0·1, 0·15 and so on, and also on every slide rule; if the slide is reversed the ½-in. divisions of the 10-in. natural scale mark 20 points on the single logarithmic scale, the readings of which coincide with the preferred numbers. Comparing this system with the SWG, thirteen of the thirty-four sizes are identical, eight differ by less than 2½ per cent., and ten by between 2½ and 5 per cent. Only in three sizes is 5 per cent. exceeded.

The prospects of arriving at an Empire-U.S. agreement would thus appear to be favourable, especially since British industry in general appears to welcome the substitution of direct measures, expressed in decimals of an inch, for numbered gauge sizes. Copies of the Memorandum are available, with four comparative wire tables and two graphs, free of charge to trade associations and at 2s. net to individual applicants, from the Institution, 28, Victoria Street, S.W.1.

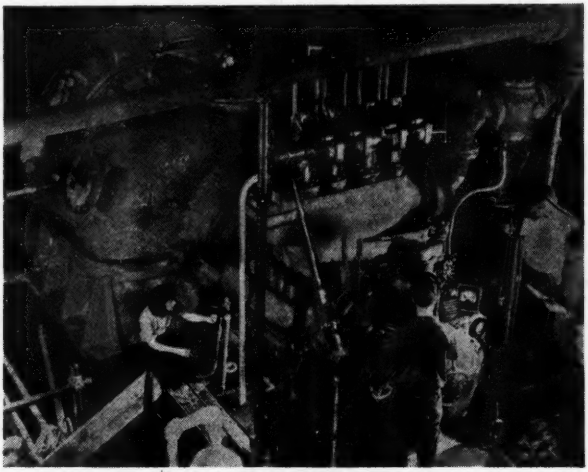
Resistance Alloys

PURPOSES for which the use of copper-nickel alloys is prohibited as well as those for which they are permitted when technically justified, in the absence of an alternative, for making electrical resistances for controlling and starting all kinds of machinery, in instruments, heating elements, thermo-couple wires, etc., are listed in an informative article in "Monel Notes—27" (Henry Wiggin & Co., Ltd.) which describes ways and means of reducing the nickel content of alloys of this class. Alternative substances are considered, compositions being tabulated together with electrical and other properties. Means by which manufacturers of resistances may calculate, without much difficulty, the theoretical dimensions of substitute wires are indicated, the manner in which appropriate formulæ are arrived at being outlined. Approximate current-carrying tables are included to serve as a rough guide, but need always to be checked by practical tests. The characteristic most difficult to reproduce in a substitute material is the very low temperature coefficient of most electrical substances compared to iron-based alloys. But an article in the *Electrical Review* of September 25th, 1942, showed that it is possible to employ a material of comparatively high temperature coefficient for making many kinds of control gear and current regulators.

News from America

· *Remarkable Economy Through Daylight Saving*

WRITING to a committee which is considering the retention or abandonment of "war time" in the United States, Mr. Leland Olds, chairman of the Federal Power Commission, has given some particulars of the benefits derived from the "extra" hour of daylight. He says, according to the *Electrical World*, that "war time" cut the December, 1942, peak load on power stations by 1,500,000 kW, and he estimates that during last year a saving of 1,000 million kWh was achieved by this means, "the equivalent of 10,000 car-loads of coal."



A 30,000-kW set for a floating power station

Floating Power Stations

Four floating power plants are being built for the War Production Board for the purpose of reinforcing the power supply to manufacturing areas as an emergency measure. They will be towed through inland waterways and anchored in suitable positions. The accompanying illustration, reproduced from the *Electrical World*, shows a 30,000-kW turbo-generator for one of these floating power stations under test at the works of the General Electric Co.

Lighting Fittings Restricted

As a means of saving metal the War Production Board placed restrictions upon the use of material for lighting fittings. Allowable metal in standard utility and industrial fittings was reduced by 60 per cent. and that in residential lighting fittings by 80 per cent. Now it has been decided that not more than 6 oz. of metal may be used in residential fittings. This restriction s reinforced by a provision that the only incandescent lighting fittings generally available will be those partly fabricated or held in stock by dealers. Essential users will share the rest.

At the same time there has been a certain relaxation of the restrictions on the supply of lamps to civilians. It was stated that in April 16 million lamps would be available on "unrated" orders, equivalent to 60 per cent. of the number sold to residential and other users during April, 1941. There has also been a release of extra tungsten to lamp manufacturers.

A Domestic Dehydrator

Dehydration of fruit and vegetables for export purposes has saved a great deal of shipping space. It can also be employed for saving space in the larder and for the preservation of food for the winter.

The Arkansas Power & Light Co. announces that two of its employees have designed simple equipment for the purpose and the company is to popularise it amongst consumers. The apparatus consists of a simple wooden cabinet fitted with racks. A small electric fan circulates the air inside the cabinet which is heated by five 200-W lamps. It is stated that the unit can be built for about $10 from scrap timber, but it is not made clear whether this price includes the electrical equipment.

Interference with Radio

Complaints of interference with broadcast reception received by a supply undertaking in the United States were successfully met in an instance reported in the *Electrical World*. The trouble was due to a 600-V supply for traction given by a 500-kW rotary convertor, the shaft of which tended to be insulated from the frame by the oil film on which it floated. A brush holder was provided to furnish a pressure connection against the shaft, thus penetrating the oil film. The carbon brush was connected to earth by a wire cleated to the frame.

Colorado Power Bill

The Colorado General Assembly, after a stormy session, has referred the State Power Authority Bill to a committee to study and make recommendations to the 1945 legislature. The Bill would permit the Authority to purchase any electric or gas utilities offered for sale in the State (a programme to buy the Public Service Co. of Colorado and other holding company owned concerns.)

ELECTRICITY SUPPLY

Tightening-up at Cheltenham. Midland Counties Reduction.

Barrow-in-Furness.—AUTOMATIC BOILER CONTROL.—At a meeting of the Electricity Committee the electrical engineer reported that the Hagan automatic boiler control which had been installed had been extremely successful and the Committee decided to ask James Gordon & Co., Ltd., the manufacturers, to submit proposals for extending such control to another boiler.

Blackpool.—SWITCHGEAR MODIFICATIONS.—The Electricity Committee, having had negotiations with the Electricity Commissioners regarding modifications to the 66-kV switchgear at the power station, is to seek sanction to borrow £26,569 for the scheme.

Cheltenham.—PAYMENT OF ACCOUNTS.—At a recent meeting of the Electricity Committee the borough electrical engineer (Mr. R. W. Steel) reported that he had consulted the borough treasurer regarding the method of dealing with the arrears of electricity accounts. Considerable latitude had been given in the past—in some cases up to three months had expired before the supply was cut off—and it was desirable that steps should be taken to tighten up the arrangements. The Committee approved new arrangements under which consumers will be given a total of seven weeks from receipt of the accounts, after which, in the absence of exceptional reasons, the supply will be cut off.

Lichfield.—INCREASE NOT CHARGED.—The 10 per cent. increase adopted in 1940 was waived for the quarter ended March 31st last, and the Electricity Committee has now decided to repeat this concession for the June and September quarters.

Midlands.—REDUCED CHARGES.—At the annual meeting of the Midland Counties Electric Supply Co., Ltd., last March, the chairman, Mr. W. Shearer, recalled that last year reductions in charges had been put into operation, and added that the company had under consideration further revisions of the various tariffs. It is now announced that after the meter readings for the quarter ending June 30th, substantial tariff reductions affecting all consumers will be made in the areas served by the Midland Counties group, including the Midland Electric Light & Power Co., Ltd., the Leicestershire and Warwickshire Electric Power Co., the Derbyshire and Nottinghamshire Electric Power Co., and the Tamworth District Electric Supply Co., Ltd.

Thornaby - on - Tees.—AMALGAMATION OF UTILITIES.—The Town Council has considered a suggestion for the amalgamation of the six Teeside authorities, but has decided against the proposal. The Council has decided, however, that the principle should be applied to public utility services such as gas, electricity and transport.

Overseas

Bulgaria.—NEW DAMS.—In addition to the dam on the Rositza river in Northern Bulgaria, already under construction, which will be ready in 1945, two new dams are to be built across the Topolinza and Tundscha rivers in central Bulgaria. The Ministry has set aside 21 million levas for this purpose. The dams will provide water for irrigation and a considerable part of Bulgaria's electric power.

Canada. — HALIFAX COUNCIL'S PURCHASE APPLICATION.—The City of Halifax, Nova Scotia, recently sought authority to buy the Nova Scotia Light & Power Co., the $10,000,000 utility that supplies Halifax with electricity and gas and operates the tramways, but consideration of the matter was deferred by the Provincial Government, which was due to adjourn in a few days.

Italy.—POWER PRODUCTION.—It is reported that production of electric power in Italy increased by 37 per cent. between 1937 and 1942 and now exceeds 20,000 million kWh a year. This has enabled Italy, according to the Paris Radio, to withstand the British blockade. Over 7,000 km of the railways has been electrified, saving 2,784,570 tons of coal per year or about 60 per cent. of Italy's requirements. Trolley-buses now operate over 400 km of route.

Spain.—NEW POWER STATIONS.—It is reported that the Urquijo finance group is planning the building of new power stations on the Tagus near Madrid, in co-operation with Union Electrica Madrileña; this would mean a valuable addition to the supply to the Spanish capital, whose requirements have materially increased in recent years, states the official German news agency from Madrid. At the same time the Saltos del Alberche intends to start work in the near future on the long-planned dams on the Alberche at San Juan and Las Picades, as the subvention in prospect for regulation work on the Alberche will apparently soon be paid.—*Reuter's Trade Service.*

RADIO & TELEPHONY

Europe.—NEW TRUNK LINES.—The Rumanian Post Office has concluded a contract with a German company for the immediate installation of a network of telephone and telegraph lines linking Germany, Rumania and Bulgaria, states the Italian news agency. Ten new telephone and three new telegraph lines between Istanbul and Sofia have been built in order to improve communications between Turkey and Europe.—*Reuter.*

India.—POSTS AND TELEGRAPHS.—A summary of the activities of the Indian Posts and Telegraphs Department during 1941-42 shows that the number of telephone subscribers increased from 94,000 to over 101,000 and trunk calls from 2·8 millions to 3·2 millions. The number of telegrams sent rose from 19 millions to 22·5 millions. To the substantial surplus of Rs. 3·5 crores on the year's working of the Department all branches contributed, namely, posts, telegraphs, telephones and wireless.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

The British Electric Traction Co., Ltd., reports a revenue for the year ended March 31st of £760,293, as compared with £767,588 for the previous year. After deducting £59,868 for expenses, etc., and £51,553 for income tax, and charging £79,479 for debenture interest, there is a profit of £569,393 (against £527,393).

It is proposed to pay final dividends of 5 per cent. on the participating preference stock, making 8 per cent. for the year; 4 per cent. on the preferred ordinary stock, making 8 per cent; and 30 per cent. on the deferred ordinary stock, making 45 per cent., all less tax, leaving £50,435 to be transferred to undivided profits account. The basis for computing the company's profits for the purposes of excess profits tax has now been settled, and on the agreed basis there is no liability to E.P.T. for the year ended March 31st last or for previous years. The reserves for E.P.T. provided out of past profits amounting in total to £170,000 are accordingly no longer required and have been transferred to undivided profits account.

Whitehall Electric Investments, Ltd.—The report to be presented at the annual meeting on June 23rd shows a net profit of £105,900 for the year to March 31st, as compared with £106,900 for 1941-42. After meeting income tax and preference dividend the balance carried forward is reduced from £421,730 to £348,520. A loss of £998,270 upon the sale of the company's interest in Lecrin, Spain, has been charged to capital reserve; the net amount received was £483,587. Proposals for the rearrangement of the company's capital were sanctioned by the Court in March. It is estimated that the consolidated net income during the current year will be not less than £130,000, before allowing for possible loss on the sale of investments and crediting no income from the Athens interests. The 6 per cent. preference dividend requires £75,000. It is not proposed to pay an ordinary dividend but to use the surplus to increase the carry forward or for reserves.

Siemens Bros. & Co., Ltd.—At the annual meeting of the company last week the question of increased wear and tear on plant under wartime conditions was referred to by the chairman, Lord Queenborough, G.B.E., in a statement which had been circulated. He said that they had again succeeded in increasing their output during 1942. In view of the very heavy demands thereby entailed on their plant and equipment, which moreover had to be worked under present conditions in many cases by less skilled employees, they had thought it prudent to make special provision in the accounts by writing down the plant over and above the figure set out for depreciation in the profit and loss account. They had also added £140,000 to the war contingencies reserve which now stood at £830,000; £50,000 of this addition to reserves was the reserve for A.R.P. which in previous years had been shown separately in the balance-sheet. The balance of this addition to reserves, together with the special provision for writing down plant and equipment, was taken from capital receipts arising out of settlements of damage claims.

Ferranti, Ltd., have called an extraordinary general meeting for July 15th to consider resolutions increasing the maximum number of directors from seven to nine and raising the limit of the company's borrowing powers to £3,000,000. The board states that the increased financial facilities will be used for current requirements and not for items of the nature of capital expenditure.

Franco Signs, Ltd., reports combined net trading profits of subsidiaries for the year to September 30th of £19,550, as compared with £19,801 for the preceding year. The net revenue of the parent company for the year to March 31st is £7,468 (against £7,508). A first and final dividend of 7½ per cent., less tax, is paid (same), and £11,387 is carried forward (against £11,418 brought in). At yesterday's annual meeting a resolution was to be submitted sanctioning an increase to £500,000 in the borrowing powers of the company which are at present limited to £300,000.

Thomas De La Rue & Co., Ltd., propose to pay a final dividend of 25 per cent., making 35 per cent. for the 15 months to March 27th (equal to an annual rate of 28 per cent.). No dividend was paid for the last accounting period of 21 months to December 27th, 1941. The last distribution was a final dividend of 9 per cent. and a bonus of 6 per cent. (1939-40), making 21 per cent. for the year.

David Brown & Sons (Huddersfield), Ltd., report trading profits of £564,649 for the past year, as compared with £437,472, but £484,870 of this is absorbed by income tax and E.P.T. (against £376,072). The dividend on the ordinary shares is maintained at 10 per cent. A balance of £43,519 with part of the sum brought in, amounting to £100,000, is transferred to contingencies reserve.

The National Electric Construction Co., Ltd., reports a net profit for 1942 of £33,732, as compared with £31,952 for the previous year. As already announced the dividend for the year is maintained at 10 per cent., and £15,232 is placed to undivided profits account, making £168,910.

The Mexican Light & Power Co. last week announced its intention of paying off the arrears of interest up to December 1st last on its 5 per cent. second mortgage bonds and debenture stock. The payment, 13¾ per cent., is to be made on July 1st.

Simms Motor Units, Ltd., reports an increase in profit from £53,374 to £95,268, before providing for taxation—£85,500 (against £34,500). The ordinary dividend is raised from 8 to 10 per cent.

Cable & Wireless (Holding), Ltd., proposes to pay a dividend of 4 per cent., less tax, on the ordinary stock for 1942 (unchanged).

MINISTRY OF SUPPLY

You wouldn't shoot rabbits with a field gun

— yet it is still a frequent practice to order larger motors and control gear than the job *really* needs. This margin of size means wasted man-hours and materials. Save this waste in war-time

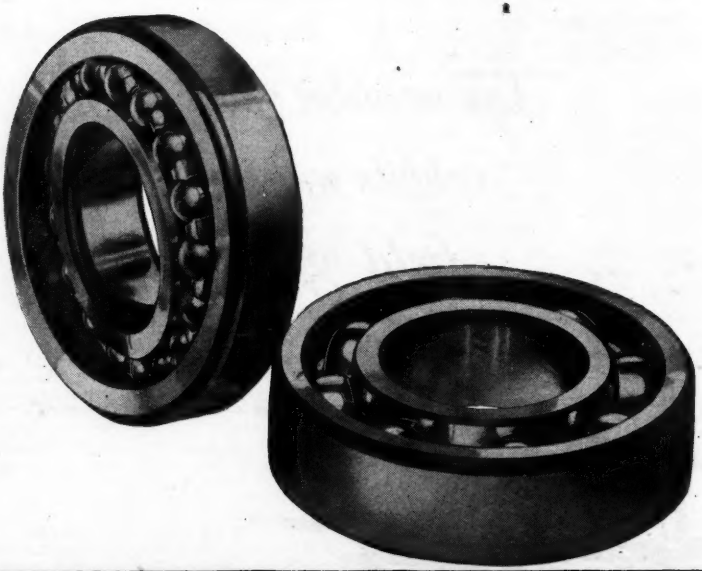
Moreover, specify only standard equipment as shown in manufacturers' catalogues. Don't ask for non-standard items such as special push-button boxes and complicated control gear. These are "luxuries" we cannot afford in war-time and they interfere with production flow.

Make a SMALLER motor do the job

ISSUED IN COLLABORATION WITH BRITISH ELECTRICAL MANUFACTURERS

THIS SPACE IS PROVIDED BY VERITYS LTD., BIRMINGHAM

SUPPORT THE ELECTRICAL INDUSTRIES RED CROSS FUND



Fischer
ALL-BRITISH
ball bearings

FISCHER BEARINGS CO. LTD., WOLVERHAMPTON

Associated with British Timken Ltd.

SUPPORT THE ELECTRICAL INDUSTRIES RED CROSS FUND

Cable & Wireless, Ltd., announces a final dividend of 2¼ per cent., maintaining the distribution for the year at 4 per cent.

Marconi's Wireless Telegraph Co., Ltd., is maintaining its ordinary dividend for the year at 7 per cent. by a final payment of 3½ per cent., less tax.

The Globe Telegraph & Trust Co., is paying a final ordinary dividend of 2 per cent., making 5 per cent., tax free, for the year (unchanged).

The Telephone Manufacturing Co., Ltd. proposes to pay a final dividend of 6½ per cent., maintaining the distribution for the past year at 9 per cent.

The Electric & General Investment Co., Ltd., has announced a final dividend of 6½ per cent., less tax, making 9 per cent. for the year (same).

Keith Blackman, Ltd., from a net profit of £149,601 for 1942-43 (against £118,167), are maintaining the dividend at 20 per cent.

Ruston & Hornsby, Ltd., have again declared a dividend of 12½ per cent. for the past year.

Turner & Newall, Ltd., have declared an interim dividend of 3½ per cent. (same).

The Western Union Telegraph Co., is paying a quarterly dividend of 50 cents. (unchanged).

New Companies

Electrical Services, Surbiton, Ltd.—Private company. Registered June 3rd. Capital, £1,500. Objects: To carry on the business of manufacturers and repairers of, and dealers in, electrical and mechanical apparatus and accessories, radio sets and valves, gramophones, etc. J. Cattermole, 107, Surbiton Hill Park, Surbiton, Surrey, is a permanent director. Registered office: 115, Ewell Road, Surbiton, Surrey.

W. S. Watson (Glasgow), Ltd.—Private company. Registered in Edinburgh May 31st. Capital, £1,000. Objects: To carry on the business of electricians, electrical and general engineers, etc. Subscribers: W. L. R. Duthie and A. L. Duthie, both of 55, Stamperland Avenue, Clarkston, Renfrewshire. Registered office: 152, Gorbals Street, Glasgow.

Esher (Plastics), Ltd.—Private company. Registered May 27th. Capital, £1,000. Objects: To carry on the business of producers of, and wholesale or retail dealers in, rubber, and resin and any of their derivatives and articles made therefrom, radio, television, electrical and other apparatus, etc. Directors: R. B. Page, 8, Woodlands Road, Surbiton, Surrey, and R. K. Wagstaff, C.A., Flat 4, 7, Nottingham Road, Croydon. Registered office: 87, Bishopsgate, E.C.2.

Page (Plastics), Ltd.—Private company. Registered May 28th. Capital, £1,000. Objects and other particulars are similar to those of Esher (Plastics), Ltd.

Companies' Returns

Statements of Capital

British Electric Transformer Co., Ltd.—Capital, £1,000,000 in 190,625 preference and 375,000 ordinary shares of £1, and 1,737,500 ordinary shares of 5s. Return dated January 4th, 1943. 190,625 preference and 400,000 5s. ordinary shares taken up. £266,518 12s. 6d. paid on 176,518¾ preference and 360,000 ordinary shares. £24,106 7s. 6d. considered as paid on 14,106¾ preference and 40,000 ordinary shares. Mortgages and charges: Nil.

Bullers, Ltd.—Capital, £400,000 in 20,000 5 per cent. cumulative preference shares of £10, of which 15,000 have been converted into stock; and 20,000 ordinary shares of £10, of which 15,593 have been converted into stock. Return dated January 12th, 1943. £150,000 preference and £155,930 ordinary stock taken up. £150,070 paid on £150,000 preference and £70 ordinary stock. £155,860 considered as paid on £155,860 ordinary stock. Mortgages and charges: £140,092.

Barlow-Whitney, Ltd.—Capital, £6,000 in 2,500 preference and 3,500 ordinary shares of £1. Return dated January 14th. 1,900 preference and 3,500 ordinary shares taken up. £5,100 paid on 1,900 preference and 3,200 ordinary shares. £300 considered as paid on 300 ordinary shares. Mortgages and charges: Nil.

Julius Sax & Co., Ltd.—Capital, £10,000 in 3,000 7½ per cent. preference shares of £1 and 35,000 ordinary shares of 4s. Return dated January 13th, 1943. 2,650 preference and 18,000 ordinary shares taken up. £5,051 paid on 2,650 preference and 12,005 ordinary shares. £1,199 considered as paid on 5,995 ordinary shares. Mortgages and charges: Nil.

Century Electric Co., Ltd.—Capital, £5,000 in £1 shares. Return dated December 31st, 1942 (filed February 9th, 1943). 2,387 shares taken up. £2,387 paid. Mortgages and charges: Nil.

Flexible Lamps, Ltd.—Capital, £5,000 in £1 shares. Return dated December 31st. All shares taken up. £2,300 paid. £2,700 considered as paid. Mortgages and charges: Nil.

Dynamo Lighting & Ignition, Ltd.—Capital, £250 in 1s. shares. Return dated January 14th, 1943. 2,000 shares taken up. £100 paid. Mortgages and charges: Nil.

Mortgages and Charges

British Rola, Ltd.—Equitable assignment of contract moneys, dated May 29th, 1943, to secure all moneys due or to become due from the company to Lloyd's Bank, Ltd., not exceeding at any one time £60,000. (Registered June 1st, 1943, by permission of the Court.)

Bennie Lifts, Ltd.—Satisfaction in full on March 30th, 1943, of debenture and second debenture, dated January 26th, 1938, and August 7th, 1940, and registered February 10th, 1938, and August 9th, 1940, securing £5,000 and £3,000 respectively.

Bankruptcies

R. F. Lovegrove, electrical engineer, carrying on business as Wallace Cook & Co., at 34, Green Lane, Northwood, Middlesex.—Discharge suspended for nine months until February 11th, 1944.

STOCKS AND SHARES

TUESDAY EVENING.

THE dullness which has overtaken the prices of gilt-edged securities is giving rise to a shade of disquiet amongst investors whose money is employed in the best-class stocks. It cannot be said that the market is "flat." Prices have not fallen to any great extent during the past three months. But the dwindling of quotations is consistent enough to arouse uneasiness, the more so as there seems to be no tangible reason for it. Probably insufficient weight has been attached to the effect of the "Wings for Victory" weeks.

Of late there has been no release of money by that convenient requisitioning process which, while it was going on, provided a substantial degree of assistance to Stock Exchange markets as a whole, and to those, more particularly, concerned with the front-rank stocks. The prices of industrial ordinary shares are more or less immune from the factors that make for dullness in gilt-edged securities, but owing to a slackening of business throughout the Stock Exchange markets, the tendency on the whole is towards slightly easier prices.

Cable & Wireless

The expectation that Cable & Wireless (Holding) would declare a higher dividend on its ordinary stock than the 4 per cent. which has been paid of recent years, was doomed to disappointment, the dividend being repeated at 4 per cent. This brought about a fall in the price from 85 to 78.

Presumably a bull account had been built up in the stock, for the fall occurred very rapidly and there was a distinct pressure to sell. As indicated here on several previous occasions, caution had looked for no more than a repetition of the 4 per cent. rate, though good figures were considered likely to be forthcoming in the annual report. On the fall, the stock returns a little over 5 per cent. on the money, and this consideration served to bring in support on the drop. At 79 xd. the price shows a fall of 2½ points. The preference at 112 has regained its 10s. decline of last week.

Transport

London Passenger Transport prior-charge stocks remain dull. The 5 per cent. "B" stock is down a point at 115½. Nor is it easy to sell any but moderate amounts of the stocks at anything over the lowest prices officially quoted. Transport "C" stock at 61½ is unchanged. Southern Railway stocks hold their previous levels. British Electric Traction deferred keeps steady at 108s. Thomas Tillings at 52s. 9d. are still dull. In the foreign group, Anglo-Argentine Trams are better, it being thought that the revolution will benefit the country and its industries.

Callender's Cable

Brief mention was made here last week of the pleasant surprise which Callender's Cable & Construction afforded its shareholders by the declaration of an additional bonus of 5 per cent. on top of the usual 15 per cent. dividend for the year. The secret had been so closely guarded that only an hour before the announcement (which put up the price of the shares to 90s.) an order to sell a few shares at 81s. 6d. could not be carried out. From 90s. the price rose to £5 before any reaction occurred. The declaration served to quicken curiosity as to whether there may be any likelihood of the kindred companies acting in a similar way.

The market prices of other shares in the same group have undergone little variation. British Insulated are ¼ lower at 106s. 3d. Henley's remain unchanged at 25s. 6d. for the 5s. shares. By comparison with these two, the dividends upon which are also 20 per cent., Callender's at 95s. 6d, cum 1s. 6d. net dividend, looked cheap. Apparently the rise attracted the taking of profits, because a few thousand shares which came to market were some little time finding a home.

Price Fluctuations

Notting Hill Electric 6 per cent. £10 preference have hardened to their par price. A number of other 6 per cent. preference shares in this group have receded about 1s., leaving them at 30s., a price which gives a yield of 4 per cent. on the money. Lancashire ordinary are 6d. easier at 34s. 6d. Scottish Power ordinary, at 37s. 6d., are unaffected by last week's debate in the House of Lords. A few pence rise lifted Atlas Electric to 5s. 6d.

Oriental Telephones are better at 41s. 3d. upon tardy recognition of the shares' break-up value as measured by the known assets of the company. The shares of the equipment concerns show no decided disposition. Telegraph Constructions are up 1s. to 50s. Hall Telephones at 25s. 9d. have lost 6d. The radio list is somewhat irregular, E.M.I. being 3d. down at 22s. 6d., E. K. Cole 6d. up at 21s. 6d. Murex at 5½ and Tube Investments at 92s. are easier. Thorn Electrics rose 3d. to 21s. 3d., while Vactrics at 12s. 6d. are lower by the same amount.

Electric & Musical Industries

The E.M.I. Company has set at rest rumours which were current at the beginning of last month in connection with the sale of its Rudge-Whitworth shares. The purchaser of the issued capital of Rudge-Whitworth, £151,000, is the Raleigh Cycle Co. The shares were held by the Gramophone Company, a subsidiary of Electric & Musical

(*Continued on page* 832)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend Previous	Dividend Last	Middle Price June 15	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies					
Bournemouth and Poole	12½	12½	56/6	..	4 6 10
British Power and Light	6	7	31/–	..	4 10 4
City of London	7	7	30/–	..	4 13 4
Clyde Valley	8	8	39/–	..	4 2 0
County of London	8	8	39/–	..	4 2 0
Edmundson's:					
7% Pref.	7	7	34/–	..	4 2 4
Ord.	6	6	28/6	..	4 4 3
Elec.Dis.Yorkshire	9	9	44/6	..	4 1 0
Elec. Fin. and Securities	12½	12½	52/–	..	4 16 1
Elec. Supply Corporation	10	10	46/–	..	4 7 0
Isle of Thanet	2	Nil	17/–	..	—
Lancs. Light and Power	7½	7½	34/6	–6d.	4 7 0
Llanelly Elec.	5½	6	26/–	..	4 12 4
Lond.Assoc.Electric	4	3	22/–	..	2 14 10
London Electric	6	6	26/6	..	4 10 7
London Power Red. Deb.	5	5	104½	..	4 15 7
Metropolitan E.S.	8	8	38/6	..	4 3 2
Midland Counties	8	8	38/–	..	4 4 2
Mid. Elec. Power	9	9	43/–	..	4 3 9
Newcastle Elec.	7	7	31/–	..	4 10 5
North Eastern Elec. Ordinary	7	7	32/–	..	4 7 6
7% Pref.	7	7	34/–	..	4 2 4
Northampton	10	10	47/6	..	4 4 0
Notting Hill 6% Pref. (£10)	6	Nil	10	+½	—
Northmet Power: Ordinary	7	7	36/6	..	3 16 8
6% Pref.	6	6	31/–	..	3 17 5
Richmond Elec.	6	6	26/–	..	4 12 4
Scottish Power	8	8	37/6	..	4 5 4
Southern Areas	5	5	22/6	..	4 9 0
South London	7	7	26/–	..	5 7 8
West Devon	5	5	23/–	..	4 7 0
West Glos.	4½	3½	23/–	..	3 0 10
Yorkshire Elec.	8	8	40/–	..	4 0 0
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	5/6	+3d.	—
Calcutta Elec.	7*	6*	36/6	..	3 5 7
Cawnpore Elec.	10	10	32/–	+2/–	6 5 6
East African Power	7	7	32/6	..	4 6 2
Jerusalem Elec.	7	5	28/6	..	3 10 2
Kalgoorlie (10/–)	7½	5	9/–	..	5 11 1
Madras Elec.	6*	4*	24/6	..	—
Montreal Power	1½	1½	30	+2½	5 0 0
PalestineElec."A"	Nil	4*	42/3	+6d.	1 18 0
Perak Hydro-elec.	6	7	9/–	..	—
Shawinigan Power	83cts.	90cts.	21	+1	—
Tokyo Elec. 6%	6	6	20	..	—
VictoriaFallsPower	15	15	4¼	..	3 11 9
WhitehallInv.Pref.	—	—	25/–	..	4 16 1

Company	Dividend Previous	Dividend Last	Middle Price June 15	Rise or Fall	Yield p.c. £ s. d.
Public Boards					
Central Electricity:					
1955–60 (Civil Defence)	—	3	100	..	3 0 0
1955–75	5	5	115	..	4 7 0
1951–73	4½	4½	107	..	4 4 1
1963–93	3½	3½	103½	..	3 7 8
1974–94	3½	3½	101	..	3 3 9
LondonElec.Trans. Ltd.	2½	2½	96½	..	2 11 10
London & Home Counties 1955–75	4½	4½	111	..	4 1 1
Lond.Pass.Trans.:					
A	4½	4½	116½	..	3 17 3
B	5	5	115½	–1	4 6 7
C	2¾	3	61½	..	4 17 7
WestMidlandsJ.E.A. 1948–68	5	5	110	..	4 11 0
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	112½	..	5 6 9
Def.	1½	1½	28	..	5 7 2
Anglo-Portuguese	8	8	24/6	..	6 10 7
Cable & Wireless:					
5½ Pref.	5½	5½	112	+½	4 18 3
Ord.	4	4	79xd	–2½	5 1 4
CanadianMarconi $1	Nil	4cts.	10/9	..	—
Globe Tel. & Tel.:					
Ord.	8½*	5*	35/–	..	2 17 2
Pref.	6	6	28/9	..	4 3 6
GreatNorthernTel. (£10)	Nil	Nil	24	..	—
Inter. Tel. & Tel.	Nil	Nil	18	..	—
Marconi-Marine	7½	7½	33/–	..	4 11 0
Oriental Tel. Ord.	16	10	41/3	+2/3	—
Telephone Props.	6	Nil	13/9	..	—
Tele. Rentals (5/–)	10	10	11/–	..	4 11 0
Traction and Transport					
Anglo-Arg. Trans.:					
First Pref. (£5)	Nil	Nil	4/6	..	—
4% Inc.	Nil	Nil	13	+1	—
Brit.Elec.Traction:					
Def. Ord.	45	45	1085	..	4 3 2
Pref. Ord.	8	8	170	..	4 14 2
Bristol Trams	10	10	50/–	..	4 0 0
Brazil Traction	$½	$1	32	..	—
Calcutta Trams	8	5½	42/6	+⅛	2 11 9
Cape Elec. Trams	5	6	25/6	..	4 14 0
Lancs. Transport	10	10	44/3	..	4 10 4
Mexican Light:					
1st Bonds	5	5	107½	+3½	4 13 0
Rio 5% Bonds	5	5	104½	..	4 15 9
Southern Rly.:					
5% Prefd.	5	5	75	..	6 13 4
5% Pref.	5	5	112	..	4 9 3
T. Tilling	10	10	52/9	..	3 15 9
West Riding	10	10	43/–	..	4 13 0

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price June 15	Rise or Fall	Yield p.c.
Equipment and Manufacturing					£ s. d.
Aron Elec. Ord...	7½	10	41/3	..	4 17 0
Assoc. Elec.:					
Ord.	10	10	49/6	..	4 1 0
Pref.	8	8	40/–	..	4 0 0
AutomaticTel.&Tel.	12½	12½	58/–	..	4 6 2
Babcock & Wilcox	11	11	48/–	+6d.	4 11 7
British Aluminium	10	10	49/6	−6d.	4 1 0
British Insul. Ord.	20	20	5 5/16	−1/16	3 15 6
British Thermostat (5/–)	18½	18½	17/6	..	5 5 9
British Vac.Cleaner (5/–)	10	15	24/3	..	3 1 10
Brush Ord. (5/–)	6	8	8/–	..	5 0 0
Burco (5/–) ..	15	15	14/3	..	5 5 1
Callender's ..	15	20	95/6	+6d.	4 3 8
ChlorideElec.Storage	15	15	82/6	..	3 12 8
Cole, E. K. (5/–)	7	10	21/6	+6d.	2 6 6
Consolidated Signal	17	24	5 7/16	−1/8	4 8 3
Cossor, A. C. (5/–)	15	10*	21/–	..	1 15 9
Crabtree (10/–) ..	17½	17½	37/6	..	4 13 4
Crompton Parkinson Ord. (5/–) ..	20	20	25/–	..	4 0 0
E.M.I. (10/–) ..	6	6	22/6	−3d.	2 13 4
Elec. Construction	10	10	44/–	..	4 11 0
Enfield Cable Ord.	12½	12½	54/6	..	4 11 9
Elecl. Switchgear (10/–)	10	10	20/–	..	5 0 0
English Electric	10	10	48/–	..	4 3 4
Ensign Lamps(5/–)	25	25	21/3	..	5 17 8
Ericsson Tel.(5/–)	22†	20†	47/6	..	2 2 2
Ever Ready (5/–)	40	40	37/6	..	5 6 8
Falk Stadelmann	7½	7½	31/–	..	4 16 9
Ferranti Pref. ..	7	7	28/9	..	4 17 5
G.E.C.: Pref. ..	8½	6½	33/–	..	3 18 9
,, Ord. ..	17½	17½	89/–	..	3 18 8
Greenwood&Batley	15	15	39/–	..	7 13 10
HallTelephone(10/–)	12½	12½	25/9	−6d.	4 17 0
Henley's (5/–) ..	20	20	25/6	..	3 18 6
4½% Pref. ..	4½	4½	23/–	..	3 18 3
Hopkinsons ..	15	17½	63/9	..	5 9 9
India Rubber Pref.	5½	5½	20/–	..	5 10 0
Intl. Combustion	30	30	6½	..	4 17 10
Johnson & Phillips	15	15	69/6	..	4 6 2
LancashireDynamo	20	22½	91/3	+1/8	4 18 9
Laurence,Scott(5/–)	15	12½	12/–	..	5 4 2
London Elec. Wire	7½	7½	31/6	..	4 15 3
Mather & Platt	10	10	48/9	..	4 2 0
Met.Elec.CablePref.	5½	5½	21/3	..	5 3 6
Murex	20	20	5½	−1/8	3 16 6
Pye Deferred (5/–)	25	25	22/6	..	5 11 1
Revo (10/–) ..	20	17½	35/6	..	4 18 7
Reyrolle	12½	12½	67/6	..	3 14 0
Siemens Ord. ..	7½	7½	30/3	..	4 19 2
Strand Elec. (5/–)	4	7½	6/6	..	5 15 5
Switchgear & Cowans (5/–) ..	10	20	15/6	..	6 9 0
T.C.C. (10/–) ..	5	5	16/3	..	3 1 7
T.C. & M. ..	10	10	50/–	+1/–	4 0 0
TelephoneMfg.(5/–)	9	9	12/–	..	3 15 0
Thorn Elec. (5/–)	20	20	21/3	+3d.	4 14 1
Tube Investments	20	20	92/–	−6d.	4 7 0
Vactric (5/–) ..	Nil	Nil	12/6	−3d.	—
Vickers (10/–) ..	10	10	19/6	..	5 2 7
WalsallConduits(4/–)	55	55	43/–	−6d.	5 2 2
Ward & Goldstone (5/–)	20	20	22/6	..	4 9 0
WestinghouseBrake	10	12½	65/–	..	3 17 0
West, Allen (5/–)	7½	7½	7/–	..	5 7 2

* 5 per cent. tax-free. † Dividends free of Income Tax.

Stocks and Shares (*Continued from page* 830)

Industries, and although the purchase price was not disclosed in the company's first circular, the Stock Exchange market assumption is that it must have been a good one, otherwise the company would not have accepted it. With the prospects that obtain for the extension of television after the war, E.M.I. shares, notwithstanding the negligible yield which they show at the present price of 22s. 6d., are deemed to rank with those which hold excellent promise in the days to come.

Mexican Light & Power

The Mexican Light & Power Co. has given notice that on the first of next month 13¾ per cent. will be paid on its 5 per cent. second mortgage bonds and debenture stock. This represents the full amount of unpaid accumulation of interest to December 1st last year. The remarkable progress that the company has made in paying off these arrears is reflected in the way the prices have responded. The company's first mortgage bonds were quoted at 75 eighteen months ago. To-day the price is 107½. The second mortgage bonds this time last year were 62; to-day they stand 25 points higher. Mexico is one of the few countries that have benefited by the war. Of late, the extension of United States lease-lend assistance has given further impetus to the prosperity of the country as a whole.

Other dollar stocks show an improving disposition. Montreal Light & Power shares are 2½ higher at 30. Shawinigan Power shares are up to 21. Brazilian Tractions dipped to 31¼ and recovered to 32. International "Tel. & Tel." hold their rise at 18.

Indian Shares Boomlet

Calcutta Trams are better than ever at 42s. 6d., a rise of 3s. 9d. Buyers from India are said to have added their orders to those on this side which started the rise from 25s. six weeks ago. The purchasers base their bullishness upon expectations of what price the Municipality of Calcutta may offer if it decides to take over the company's property a year hence. Calcutta Electric Supply ordinary have made no further advance upon their last week's rise to 36s. 6d., but Cawnpore Electric are a florin better at 32s. 6d. Madras Electric hold their previous advance to 24s. 6d.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

ALDIS BROS., LTD., and A. C. W. Aldis.—"Signalling lamps." 13555. October 22nd, 1941. (553537.)

Alfa-Laval Co., Ltd., and A. H. Hollister.—"Emulsifying plant." 828. January 20th, 1942. (553644.)

Arc Manufacturing Co., Ltd., G. Haim and D. M. McAllister.—"Manufacture of metal welding rods." 15136. November 24th, 1941. (553553.)

Automatic Telephone & Electric Co., Ltd., and S. R. Smith.—"Bearing arrangements." 15214. November 26th, 1941. (553608.)

Automatic Telephone & Electric Co., Ltd., T. R. Rayner and G. A. Burns.—"Telemetering arrangements." 14918. November 20th, 1941. (553503.)

R. W. Bailey and Metropolitan-Vickers Electrical Co., Ltd.—"Construction of welded frames or other structures." 15741. December 5th, 1941. (553641.)

Blackburn Aircraft, Ltd., and J. H. Martin.—"Electrical wiring systems." 16421. December 19th, 1941. (553642.)

British Brass Fittings, Ltd., and G. T. Salinger.—"Thermostatic valves." 6036. May 5th, 1942. (553630.)

British Insulated Cables, Ltd., J. K. Glover, A. Inkster and M. G. Houghton.—"Apparatus for controlling the production of inert atmospheres." 460. January 12th, 1942. (Addition to 520450.) (553585.)

British Thomson - Houston Co., Ltd.—"Electric motor control systems." 16036/41. December 17th, 1940. (553511.) "Electric discharge devices for generating polyphase high-frequency oscillations." 20/40. December 31st, 1938. (553529.)

British Thomson-Houston Co., Ltd., and R. Pohl.—"Dynamo-electric machines." 11804/42. August 27th, 1941. (Divided out of 551691.) (553662.)

British Thomson-Houston Co., Ltd., and A. T. Stretton.—"Methods of and apparatus for preventing the formation of ice on aircraft propellers." 4509. April 3rd, 1942. (553597.)

Brookhirst Switchgear, Ltd., and R. C. Harris.—"Electric switches and switchgear having auxiliary sparking contacts." 15273. November 27th, 1941. (552638.)

Drake & Gorham, Ltd., and J. Newell.—"Supporting arrangements for electric circuit conductors." 15205. November 26th, 1941. (553607.)

English Electric Co., Ltd., H. S. Carnegie, A. Asbury and E. H. H. Hassler.—"Electric controllers for winding gears for mines and the like." 10587. August 20th, 1941. (553499.)

C. Gruenberg.—"Releasable mechanical and electrical couplings." Cognate applications 15012/41 and 3154/42. November 21st, 1941. (553570.)

International Television Corporation, Ltd., P. Nagy and M. J. Goddard.—"Methods and means of automatically controlling electron beam of electron beam valve devices." 8557 July 7th, 1941. (553530.) "Electronic valve devices." 9309. July 23rd, 1941. (553532.)

Landis & Gyr. Soc. Anon.—"Fluid-tight seal for press-knob electric switches." 14499/42. November 14th, 1941. (553665.)

Lodge - Cottrell, Ltd. (International Precipitation Co., Inc.).—"Method and apparatus for the manufacture of electrodes for apparatus for the electrical precipitation of suspended particles from gaseous fluids." 1702. February 9th, 1942. (553520.)

J. Lucas, Ltd., and E. A. Watson.—"Contact breakers for ignition apparatus." 13556. October 22nd, 1941. (553538.)

Marconi's Wireless Telegraph Co., Ltd.—"Luminescent screens." Cognate applications 12308/41 and 12309/41. September 25th, 1940. (553534.)

Philips Lamps, Ltd. (Naamlooze Vennootschap Philips' Gloeilampenfabrieken).—"Detonation meters for internal-combustion motors." 1840. February 11th, 1942. (553523.) "Wireless direction finders." 2066. February 16th, 1942. (553618.) "Transmitting or receiving device comprising a dipole antenna." 15247. November 26th, 1941. (553636.)

H. S. Potter.—"Protective systems for electric cables." 1354/42. April 19th, 1941. (553646.)

Standard Telephones & Cables, Ltd.—"Gaseous insulating dielectric." 15007/41. November 27th, 1940. (553569.) "Inductance devices." 4177/42. November 14th, 1940. (553596.)

Standard Telephones & Cables, Ltd., and R. A. L. Cole.—"Arrangements for insulatingly leading electric conductors through metal casings." 15004. November 21st, 1941. (553544.)

Standard Telephones & Cables, Ltd., and J. Handley. — "Electric meters." 15006. November 21st, 1941. (553546.)

Standard Telephones & Cables, Ltd., A. A. New and S. G. Foord.—"Impregnation of organic fibrous materials with polystyrene." 15005. November 21st, 1941. (553545.)

United Aircraft Corporation. — "Pressure actuated electric switches." 117/42. December 27th,1940. (553583.)

H. G. Weihs and R. F. Mayer.—"Electric lamp-cap." 15219. November 26th, 1941. (553574.)

Westinghouse Electric International Co. "Moving stairways." 15698/41. December 7th, 1940. (553576.)

Mining "Brains Trust"

The Yorkshire North-West Branch of the Association of Mining Electrical and Mechanical Engineers is holding a "Brains Trust" at the Queen's Hotel, Barnsley, at 5.15 p.m. on Saturday, June 19th.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Salford.—June 25th. Electricity Department. One 500-kW mercury arc rectifier (June 11th).

Orders Placed

Australia.—The following acceptances of tenders are recorded in *Tenders* (Melbourne):—

NEW SOUTH WALES.—Sydney County Council Electricity Department. 33-kV armoured cable, Spec. 630 (5,250 yd. in each case).—Siemens (Aust.) Pty., Ltd. (£17,768); Noyes Bros. (Sydney), Ltd. (£17,993); British General Electric Pty., Ltd. (£18,013); Enfield Cable Works (A'sia) Pty., Ltd. (£18,098). 440-V auxiliary power switchgear for No. 10 turbo-alternator at Bunnerong power station, Spec. 603 (£4,094).—Australian General Electric Pty., Ltd.

COMMONWEALTH. — P.M.G.'s Department. Power rectifiers, Sch. C. 3900 (£3,919).—Standard Telephones & Cables Pty., Ltd.

Cardiff.—Electricity Committee. Accepted. Spare parts for coal-handling plant (£427).—Fraser & Chalmers (G.E.C.) Automatic electric alarm system (£256).—Mather & Platt.

Glasgow.—Cleansing Committee. Accepted. Renewal of two hutch tractor batteries (£105).—Tudor Accumulator Co.

Hull.—Telephones Committee. Accepted. Five tons of copper wire (£518).—Bolton & Sons.

Liverpool.—Electric Light and Power Committee. Accepted. Material required for retubing the air-heater on one boiler (£5,275).—Babcock & Wilcox.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Ardwick.—Additions to works, Midland Street, J. W. Jones; McCutcheon & Walsingham, architects, 1180A, Chester Road, Stretford.

Blackpool.—Convalescent home; J. Lynch, Derbyshire Miners' Association, 98, Saltergate, Chesterfield.

Burton-on-Trent.—Improvements, Belvedere Hospital (£1,500); borough engineer.

Clay Cross.—Additional pumping plant for U.D.C.; F. W. Hodson, consulting engineer, Bank Chambers, Loughborough.

Clayton.—Additions to works, Ashton New Road and Boardman Street; J. Riley & Sons, builders, 59, Forge Lane, Bradford, Manchester, 11.

Dorset.—Children's home (£5,000); county architect, Shire Hall, Dorchester.

Gateshead.—Temporary kitchen at the General Hospital (£1,500) and additions to joiners' shop for Town Council; borough engineer.

Glasgow.—Temporary school at Penilee; city architect.

Proposed open-air baths at Glasgow Green; city engineer.

Hertfordshire.—Additions to technical school, Watford; county architect, Hertford.

Lancashire.—Alterations for meals at schools, Haverthwaite, Grange, Holker, etc. (£2,133); L. Evans, county architect, County Offices, Preston.

Lexden and Winstree.—Houses (38) for R.D.C.; clerk, Isaac's Walk, Colchester.

Lichfield.—Sewage works (£1,300); city engineer.

Manchester.—Additions to printing works off Corporation Street; J. W. Beaumont & Sons, architects, Danlee Buildings, 53, Spring Gardens, Manchester, 2.

Additions to dairy for Dobson's Dairies, Ltd.; F. Hill, engineer, 11, Tenterden Street, Bury, Lancs.

Additions to works; Holden & Brooke, Ltd., Sirius Works, West Gorton, Manchester, 12.

Additions to brewery; Palatine Brewery, Ltd., Birch Street, West Gorton, Manchester, 12.

Extensions to laundry; Paragon Cleaners & Dyers, Ltd., Paragon Laundry, Burnage Lane, Levenshulme, Manchester, 19.

Central kitchen, Moston Lane (£7,500); J. B. Brez, chief surveyor, Education Offices, Deansgate, Manchester, 3.

Menai Bridge.—Cinema, Town Hall site; E. H. James, Llanrwst, Caernarvonshire.

Morpeth.—Extensions to a workers' hostel at Thropton; R. Carse & Sons, Oldgate, Morpeth.

Nottinghamshire.—Schools and extensions in 17 districts; E. W. Roberts, county architect, Shire Hall, Nottingham.

Oundle and Thrapston.—Agricultural workers' cottages (16) for R.D.C.; H. R. Surridge, architect, Bank Chambers, Kettering.

Scarborough.—Rebuilding sawmill, Brook Street, for Gabriel Wade and English; F. Baker, architect, York Place.

Rebuilding Corner Café, North Bay; H. V. Overfield, borough surveyor, Town Hall.

Selby.—Pumping station on River Ouse for Lower Aire Internal Drainage Board; H. J. Paul, engineer, 7, Langcliffe Avenue, Harrogate.

Stockport.—Additions to works and offices; Barnshaw & Co., Ltd., Palmer Mill, Mersey Street, Portwood.

Stretford.—Varnish kitchen additions, Fraser Road; Stirling Varnish Co., Ltd.

West Sussex.—Additions to Horsham High School for Girls (£1,143); county architect, Chichester.

Wiltshire.—Clinic for general health services at Corsham; T. Walker, county architect, County Offices, Trowbridge.